EPIDEMIOLOGY AND RISK FACTORS OF DISTAL SENSORY NEUROPATHY IN A COHORT OF HIV POSITIVE INDIVIDUALS ON FIRST LINE COMBINATION ANTI-RETROVIRAL THERAPY – A PROSPECTIVE OBSERVATIONAL STUDY

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A dissertation submitted in partial fulfillment of Doctor of Medicine- Brach I – Neurology Degree Examination of the Tamil Nadu Dr.M.G.R Medical University, Chennai to be held in August 2013

CERTIFICATION

This is to certify that the dissertation entitled "Epidemiology and risk factors of Distal Sensory Neuropathy in a cohort of HIV Positive Individuals on first line combination anti-retroviral therapy – a prospective observational study" is the bonafide original work of Dr.A.T.Prabhakar towards the D.M Branch-1 Neurology Degree Examination of the Tamil Nadu Dr. M.G.R Medical University, Chennai to be conducted in August 2013.

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ACRONYMS

ADR	Adverse drug reaction
AIDP	Acute Inflammatory Demyelinating polyneuropathy
AIDS	Aquired Immune Deficiency Syndrome
ALS	Amyotropic Lateral Sclerosis
ART	Anti Retroviral Therapy
ATT	Anti-Tuberculous Therapy
AZT	Zidovudine
BMI	Body Mass Index
CIDP	Chronic Inflammatory Demyelinating polyneuropathy
CMAP	Compound Muscle Action potential
CMC	Christian Medical College vellore
CMV	Cytomegalo -Virus
CSF	Cerebrospinal Fluid
D4t	Stavudine
DILS	Diffuse Infiltrative Lymphocytosis Syndrome
DNA	Deoxyribonucleic Acid
DRG	Dorsal Root Ganglion
DSP	Distal sensory polyneuropathy
EFV	Efavirenz
ELISA	Enzyme-Linked Immnuosorbent Assay
ENFD	Epidermal Nerve fibre Density
HAART	Highly Active Antiretroviral Therapy
HIV	Human immunodeficiency virus
I.D.Clinic	Infectious Diseases Clinic
IVIG	Intravenous Immunoglobulin
MM	Mononeuritis Multiplex
NACO	National AIDS control Organization
NCS	Nerve Conduction Studies
NCV	Nerve Conduction Velocity
NNRTI	Non-nucleoside Reverse Transcriptase Inhibitor
NRTI	Nucleoside Reverse Transcriptase Inhibitor
NVP	Nevirapine
PCR	Polymerase chain reaction
PLHA	People living with HIV/AIDS
PP	Progressive Polyradiculopathy
QST	Quantitative Sensory Testing
SNAP	Sensory Nerve Action Potential
TNS	Total Neuropathy Score
VAS	Visual Analog Scale
3TC	Lamivudine

LEGENDS

CONTENTS

TITLE OF THE ABSTRACT: Epidemiology and risk factors of Distal Sensory Neuropathy in a cohort of HIV Positive Individuals on first line combination anti-retroviral therapy – a prospective observational study

DEPARTMENT: Department of Neurology
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NAME OF THE CANDIDATE: Dr.A.T.Prabhakar

DEGREE AND SUBJECT: D.M. Branch I – Neurology

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OBJECTIVES:
To prospectively follow up a cohort of anti-retroviral therapy naïve HIV infected South Indian adults started on combination anti-retroviral therapy to assess the epidemiology of Distal Sensory Polyneuropathy and to assess the risk factors for Distal Sensory Polyneuropathy in patients on first line combination anti-retroviral therapy.

METHODS: A cohort of cART naïve HIV positive patients who have been screened to rule out neuropathy using conventional nerve conduction studies were followed up from the initiation of cART for a mean period of 59 months. Patients were recruited to the study and they were evaluated at base line, three months, six months and then on yearly for the development of neuropathy. The assessment was by historical symptoms, clinical examination, conventional nerve conduction study and sympathetic skin response.

RESULTS: Of the fifty six cART naive HIV positive patients screened 23.2% of the ART were detected to have DSP. The prevalence of symptomatic DSP amongst cART naïve patients with HIV was detected to be 5.4%. Low baseline CD4 cell count, advancing age, increasing duration of disease and advanced clinical stage of disease were identified as risk factors for DSP amongst the cART naive patients. During the follow up of forty patients on first line generic cART over a period of 59 months eight patients 20% were detected to have a DSP. The prevalence of symptomatic DSP while on first line cART was found to be 7.5%. The risk factors for the development of DSP while on cART were an age greater than 40, a persistently low CD4 count of less than 500 and weight loss while on cART. Absent SSR was associated with symptomatic DSP as well exposure to a Stavudine based cART regimen.

Introduction

The global epidemic of HIV is on a steady decline with currently 34 million people living with Human Immunodeficiency virus infection(1). However the number of people receiving antiretroviral therapy continues to increase, with 6.65 million people getting treatment at the end of 2010(2) . Though India is a country with low HIV prevalence, it has the third largest number of people living with HIV/AIDS(3). As per the Indian National AIDS control organisation (NACO) estimate in 2008-09, there are an estimated 23.9 lakh people living with HIV/AIDS(PLHA) in India with an adult prevalence of 0.31 percent in 2009(3). Neurological manifestations occur during all stages of HIV infection and are quite common amongst people living with HIV/AIDS(PLHA); of this neuropathy is the most common (4-6). Neuropathies complicate all stages of the HIV disease, and cause considerable morbidity and disability in HIV infected individuals. The prevalence of symptomatic HIV neuropathy has been described between 1.2% to 69.4%(6-8). There are 6 major clinical types of HIV-associated neuropathies that are regularly seen in large HIV clinics.(9) Distal sensory Polyneuropathy (DSP) is the most common amongst the HIV-associated neuropathies(7). DSP usually occurs in later stages of HIV infection and follows an indolent and protracted clinical course. The clinical features in DSP include distal pain, paresthesia and numbness in a typical length-dependent fashion with proximal to distal gradient(8). Toxic neuropathies-secondary to certain antiretroviral agents-are clinically similar to DSP, their temporal relation to neurotoxic medication helps distinguish them from other HIV associated neuropathies.

Antiretroviral toxic neuropathies are commonly associated with Stavudine , zalcitabine and didanosine(10). This has lead to the developed countries avoiding the use of these drugs(11, 12). Despite this, until recently Stavudine had been used

as the first line therapy in developing countries such as India in view of the low cost(13-15). However since January 2013, NACO has initiated the phasing out of Stavudine, and new patients who are anaemic (hence cannot be initiated on Zidovudine) are being initiated on Tenofovir. Data on HIV neuropathy from India is very limited. There are no electrophysiological studies on patients with asymptomatic DSP.. Wadia et al identified 85 patients with sensory neuropathy in a study of 1527 HIV infected patients(16) .In another South Indian study by N.Kumaraswamy et al involving 1443 patients of whom 72 % received a D4T based regimen , 13 % had adverse events leading to a change in regimen. Of these 15 % was attributed a symptomatic peripheral neuropathy (17). In CMC Vellore, in a study involving a cohort of 230 HIV infected patients of whom 76 % were on a D4T based regimen symptomatic neuropathy was detected in 5.2 %(18). This study thus aims to assess the incidence and risk factors for antiretroviral toxic neuropathies, in the setting of widespread use of D4T.

Objectives of the study

1. To prospectively follow up a cohort of antiretroviral therapy naïve HIV infected South Indian adults started on combination anti-retroviral therapy to assess the epidemiology of Distal Sensory Polyneuropathy

2. To assess the risk factors for Distal Sensory Polyneuropathy in patients on first line combination anti-retroviral therapy.

Review of literature

In India the human immunodeficiency virus (HIV) was first detected in Chennai in 1986 (19). The subsequent HIV epidemic was fast growing till the year 2000. However since then the adult HIV prevalence at the national level has continued its steady decline from estimated level of 0.41 percent in 2000 through 0.36 percent in 2006 to 0.31 percent in 2009(3). All the high prevalence states show a clear declining trend in adult HIV prevalence. HIV has declined notably in Tamil Nadu to reach 0.33 percent in 2009. However, the low prevalence states are now show rising trend(3) . The total number of people living with HIV/AIDS (PLHA) in India is estimated at 23.9 lakh in 2009(3). The age group 15-49 years contribute to 83 % and women contribute to 39% of all the HIV infections. . The four high prevalence states of South India (Andhra Pradesh–5 lakhs, Maharashtra–4.2 lakhs, Karnataka–2.5 lakhs, Tamil Nadu–1.5 lakhs) account for 55 percent of all HIV infections in the country(3). Of the 2.4 million PLHA in India, more than 20% of these will develop a neurological disorder despite the availability of cART(16, 20). HIV causes nervous system disease at all the stages of infection with adverse effects on quality of life, adherence to medications, employment and survival (20, 21). These disorders include in addition to distinct HIV-associated neurological syndromes, opportunistic infections and treatment-related adverse effects.

Direct HIV infection of central nervous system causes HIV-associated neurocognitive disorder (HAND) and HIV-associated dementia that affect the brain;

and vacuolar myelopathy that predominantly affects the lateral and posterior columns of the spinal cord(22-24). HIV infection of the peripheral nervous system produces a HIV-related neuropathy. There are 6 major clinical types of HIV-associated neuropathies that are regularly seen in large HIV-1 clinics.(9, 21) Distal sensory Polyneuropathy (DSP) is the most common amongst the HIV-associated neuropathies(7). With the availability of combination antiretroviral therapy (cART), the prevalence of opportunistic infections and AIDS dementia complex has declined and DSP has emerged as the single most common AIDS-associated neurologic disorder. Most estimates of prevalence of DSP fall between 30% and 60%, but reported frequencies vary depending on the diagnostic criteria used and the population studied (21)

Human Immunodeficiency Virus–Associated Peripheral Nervous System Disorders

Acute inflammatory demyelinating polyneuropathy

Acute inflammatory demyelinating polyneuropathy, or Guillain-Barré syndrome, is commonly seen during the phase of seroconversion of HIV infection and rarely during immune reconstitution on initiation of cART(25). It presents as an ascending polyradiculoneuropathy within days or weeks(26). It presents as symmetrical weakness and areflexia, with or without paraesthesias. Occasionally some patients have a protracted clinical course and are described to have the chronic form, namely, the chronic inflammatory demyelinating polyneuropathy (CIDP) (27). CSF findings in HIV-associated acute inflammatory demyelinating polyneuropathy are similar to those noted in patients who are not infected with HIV; however CSF pleocytosis can occur, which should alert the clinician to underlying HIV infection(28). CSF protein concentrations are often raised, with fewer than 10 cells per µL, but up to 50 cells per µL is can be accepted for diagnosis in patients with HIV infection(26). Electrophysiological findings of early prolongation or absent F-waves early and prolonged distal latencies, and slowed conduction velocities and in the later stages, are similar to those noted in HIV negative patients with AIDP (26). PLHA with GBS respond to treatment well as HIV negative patients. Sural nerve biopsy if done demonstrates the presence of a perivascular and endoneural mononuclear cell infiltrate with macrophage-mediated segmental demyelination. In severe cases, wallerian-like degeneration of axons can be seen. Treatment does not differ on the basis of HIV serostatus, and includes use of plasmapheresis and intravenous immunoglobulin(29) Patients who need mechanical ventilation have

equally good outcomes in the subset of HIV-infected patients with CD4 cell counts greater than 200 cells per µL(30). Patients with axonal variant of GBS have also been described(31)

Diffuse infiltrative lymphocytosis syndrome

A small subset of HIV-infected patients develop persistent CD8 hyperlymphocytosis and a Sjögren's syndrome–like syndrome associated with multivisceral CD8 T-cell infiltration, known as the diffuse infiltrative lymphocytosis syndrome (DILS). These patients have higher CD4 cell counts, fewer opportunistic infections, and longer survival times than do other HIV-infected patients(32). Some of these patients present with an acute or sub acute sensorimotor distal symmetric neuropathy, which is always painful(32). In most instances, the neuropathy is distal and symmetrical; however, in a third of patients the neuropathy might be focal at onset and progress to a multifocal and then symmetrical neuropathy(32). Diagnostic criteria include bilateral salivary gland involvement, xerostomia of greater than 6 months duration, and histological confirmation of salivary or lacrimal gland CD8 lymphocytic infiltration. Though all patients with diffuse infiltrative lymphocytosis syndrome do not have sicca symptoms or parotidomegaly, they characteristically have a circulating CD8 hyperlymphocytosis (more than 1000 cells per µL). CSF examination reveals an increased protein concentration and mild lymphocytic pleocytosis might be noted. Electromyographic and NCS study results are consistent with axonal neuropathy. Nerve biopsy shows marked angiocentric CD8 infiltrates without mural necrosis and abundant expression of HIV-1 p24 protein in macrophages. The lymphocytic infiltrate is polyclonal in most patients (33). Treatment consists of c ART

and steroid therapy and was associated with improvement in a small group of patients(32).

Chronic inflammatory demyelinating polyneuropathy

Chronic inflammatory demyelinating polyneuropathy differs from the acute disorder in that it has a more insidious progression (more than 8 weeks) and might relapse and remit. It presents as a symmetrical, mainly motor neuropathy in which both proximal and distal weakness are more prominent than are sensory findings, but can also evolve asymmetrically(27). Deep tendon reflexes are reduced or absent. Sensory complaints include paraesthesias or deep limb pain. Chronic inflammatory demyelinating polyneuropathy is probably more common than the acute form(29). It can occur in early HIV infection, but more frequently occurs in moderately advanced disease. Electrophysiological tests reveal demyelinating features such as those described for the acute disorder, but could show only subtle slowing of proximal conductions . Protein concentrations in the CSF are generally raised, with less than 50 cells per µL(27). CSF analysis is useful in exclusion of infective or neoplastic causes, especially when patients have fewer than 200 CD4 cells per µL. It is Important to note that lymphoma and diffuse infiltrative lymphocytosis syndrome neuropathy can be mistaken as chronic inflammatory demyelinating polyneuropathy. Treatment includes plasma exchange, intravenous immunoglobulin, or corticosteroids, and patients often have excellent responses(27). Initiation of cART in patients presenting with an immune-mediated disorder is an important component of treatment and can hasten recovery. Responses to treatment in HIV-infected patients are similar to those in patients not infected with HIV.

Mononeuritis Multiplex

Patients with mononeuritis multiplex present with acute onset of sensory or motor deficit limited to one or more peripheral nerve. The asymmetry of involvement is a characteristic feature to differentiate it from other HIV-associated neuropathies. This can occur both in the early and late stage. The course is self-limited in early HIV infection and is more severe in patients with advanced disease(34). The CSF analysis in these patients is nonspecific and shows only a mild elevation of protein concentration and a mononuclear pleocytosis. Electrophysiologic studies reveal a reduction of the amplitude of sensory nerve action potentials and compound muscle action potentials as well as a mild reduction in nerve conduction velocities in the distribution of single nerves. Patients with MM can have multiple pathologies on nerve biopsy. Axonal degeneration and perivascular inflammatory infiltrates are found in patients with early HIV infection or limited clinical involvement. The more severe form consists of a necrotizing arteritis with necrosis of endoneurial or epineurial vessels suggestive of Vasculitis(35). Treatment consists of plasmapheresis or IVIG (35). Corticosteroids and cyclophosphamide are reserved for aggressive cases of MM with vasculitis proved by nerve biopsy.

Progressive Polyradiculopathy

Patients with progressive polyradiculopathy (PP) present with paresthesia and, sometimes radicular pain in the cauda equina distribution. These symptoms are followed by a rapidly progressive areflexive paraparesis and ascending sensory loss, often accompanied by urinary retention(36). The upper extremities are relatively

spared. It occurs late in the course of HIV infection, in patients with low CD4 cell counts and concurrent systemic illnesses and hence PP is often under recognized(36). A prominent infection with CMV, mainly retinitis, oesophagitis, or colitis, is conspicuously present in a majority of cases(37). The CSF analysis reveals a marked polymorphonuclear cell pleocytosis, elevated protein concentration, and hypoglycorrhachia. CSF cultures demonstrate the presence of CMV in 60% of the cases(37, 38). CMV DNA may be detectable in the CSF by PCR and occasionally in blood studies can reveal cytomegalic cells with intranuclear and intracytoplasmic CMV inclusions(38). Electrophysiologic studies reveal reduced Compound muscle action potentials (CMAPs) and prolonged F waves. The electromyographic examination is useful to differentiate this syndrome from AIDP. Severe and widespread proximal axonal damage in lumbar nerve root distribution is correlated by fibrillation potentials and motor unit recruitment patterns in lower extremity muscles. The treatment of CMV-associated PP consists of intravenous ganciclovir and/or foscarnet(37). Phenotypic and genotypic characterization of viral isolates should be considered in case of resistance to treatment(39). However agents such as valaganciclovir and cidofovir have not been evaluated in patients with PP. The results of the PCR for CMV DNA in the CSF may take up to two weeks to obtain, in such situations if the workup reveals a polymorphonuclear pleocytosis, empiric treatment can be justified. In disorders predominantly affecting the lower limbs tuberculous and lymphomatous meningitis can present as a lumbosacral radiculopathy (36, 40). A chronic lumbosacral radiculopathy due to Epstein-Barr-virus-associated neurolymphomatosis has been reported(29). Lumbosacral polyradiculitis can be seen due to reactivation of herpes simplex virus type 2 in the sacral dorsal root ganglia after genital herpes, and can even progress to acute

ascending necrotising myelitis(41). A case of syphilitic lumbosacral radiculopathy has been reported in a patient with HIV infection(42).

Mononeuropathies

Cranial neuropathies

Amongst cranial mononeuropathies, Bell's palsy is the most commonly seen cranial neuropathy in HIV infected patients(21). Such cases of Bell's palsy usually occur as peri-inflammatory or post inflammatory palsies around the time of primary HIV infection (within 6 weeks pre seroconversion, or in the first weeks of seroconversion, respectively). Recovery is similar to that in patients who are not infected with HIV(21). Facial diplegia presenting as a seroconversion illness of aseptic meningitis and maculopapular rash have also been reported(43).124 Bilateral facial palsy might be the presentation of a descending acute or chronic inflammatory demyelinating polyneuropathy(44) Unilateral or bilateral facial nerve involvement can occur in diffuse infiltrative lymphocytosis syndrome in association with parotidomegaly(28). Cranial mononeuropathies in patients who are substantially immunocompromised are frequently the result of meningeal infection or lymphomatosis. Lymphoma is an important cause of cranial neuropathies; involvement of the facial and trochlear nerves and the mental branch of the trigeminal nerve presenting as a numb chin syndrome have been described(45, 46). Tuberculous meningitis commonly affecting the basal cisterns, can produce one or several cranial neuropathies(47). Reactivation of dormant varicella zoster virus in the dorsal root ganglia can occur. Treatment with aciclovir is indicated in HIV-infected patients. Additional prednisone

can be given to alleviate pain, but does not affect the incidence of post-herpetic neuralgia(21). Ramsay-Hunt syndrome, consisting of facial palsy, vertigo, deafness, and vesicles c has been reported and should not be missed(48). Monocular visual loss due to rapidly necrotizing varicella zoster virus retinopathy has been reported and can easily be misdiagnosed and treated as inflammatory optic neuritis (49).

Mononeuropathies

Entrapment neuropathies of the lateral cutaneous nerve of the thigh, common peroneal, median, and ulnar nerves are noted in inpatients with advanced HIV disease(21). whether HIV infection increases the susceptibility to get entrapment neuropathies in currently unknown(21). Pressure care in severely ill patients would prevent these complications. Patients with chronic inflammatory demyelinating polyneuropathy occasionally present initially with peroneal mononeuropathies(27).

Autonomic neuropathy

Distal sensory polyneuropathy frequently implicates small nerve fiber involvement and hence an associated autonomic neuropathy may be expected. However studies evaluating the quantitative measures of autonomic function in HIV-infected cohorts have shown inconsistent results and so far there has been no evidence of significant autonomic dysfunction(27). A community based study showed that HIV-infected patients often complained of symptoms possibly related to autonomic dysfunction, but objective evidence of autonomic dysfunction was absent(50).

However, in patients with advanced disease and severe distal sensory polyneuropathy, autonomic neuropathic symptoms, such as gastroparesis and postural hypotension, have been reported(21). Simple therapeutic measures include stopping of potentially exacerbating drugs , supplementation with salt, use of fludrocortisone, and wearing of waist-high stockings(21).

HIV-associated neuromuscular weakness syndrome

HIV-associated neuromuscular weakness syndrome is a subacute progressive weakness that is associated with hyperlactataemia and Stavudine exposure and presents as a severe, symmetrical, predominantly motor axonopathy with prominent leg involvement(51). It is associated with systemic features such as nausea, vomiting, weight loss, and hepatomegaly(51). High doses of Stavudine doses was identified as a possible etiology in the early descriptions, and subsequently has not been reported since the standard daily dose was lowered from 60 mg to 40mg. Neuromuscular weakness syndrome can be fatal, but most patients recover after Stavudine discontinuation.

.Myopathy

Myopathy was more common in the era of HAART when high dose Zidovudine was widely used(52). With the reduction of the dose of zidovudine, the incidence of Zidovudine induced myopathy has declined. HIV infection per say is associated with a Polymyosits type of myopathy and can be clinically similar to Zidovudine induced myopathy(53). Patients usually present with a proximal symmetric weakness, predominantly at the level of the hip flexors(54). HIV-1 does not seem to infect

muscle fibers, but muscle fibers are Infiltrated predominantly with $CD8^+$ T cells and macrophages(53). It is postulated that these cells secrete proinflammatory cytokines that may damage muscle fibers, precipitate muscle antigen exposure, and generate an autoimmune response(55). Zidovudine-induced myopathy is due to mitochondrial toxicity; this in turn is mediated through the inhibition of the enzyme γ-DNA polymerase, which is responsible for the replication of mitochondrial DNA. This induces an energy shortage within the muscle, which results in overt myopathy over time. The laboratory Investigations reveal a mild elevation of creatine phosphokinase with its level correlating with the degree of myonecrosis seen on muscle biopsy; but not with the weakness. Electromyographic testing may reveal myopathic motor unit potentials with early recruitment and full interference patterns, predominantly in proximal muscles(54), but it can be normal in one third of the cases(52). Muscle Biopsy in patients not treated with zidovudine presenting with myopathy, the most common finding is scattered myofiber degeneration, fibrosis, and necrosis, associated with a variable inflammatory infiltrate similar to that seen in idiopathic polymyositis(56), In zidovudine myopathy, biopsy results reveal numerous ragged-red fibers and abnormal mitochondria(56). Treatment of HIV polymyostis is similar to idiopathic polymyositis and patients have had a favorable response with corticosteroids. Other immune-based therapies such as azathioprine, methotrexate, or IVIG have also been successful(52). In zidovudine-induced myopathy, treatment consists of zidovudine withdrawal; with which most patients respond within few weeks(56).

Amyotrophic Lateral Sclerosis–Like Syndrome

There are several cases of amyotrophic lateral sclerosis (ALS)-like syndromes reported in HIV-infected individuals(57). These cases differ from classic ALS because they occurred in younger patients, they were unusually rapidly progressive, and improved after the institution of antiretroviral therapy(57, 58). The etiology of this syndrome is unclear.

Distal Sensory Polyneuropathy

Human Immunodeficiency Virus Associated

Distal sensory polyneuropathy (DSP) is the most common cause of peripheral neuropathy in HIV infection. The prevalence of symptomatic HIV neuropathy has been described between 10% to 60 %(7, 8) . Of this it is symptomatic in 35% of patients and asymptomatic in an additional 20%(59). In autopsy studies it is seen in most patients dying with AIDS(60).

Risk factors for DSP

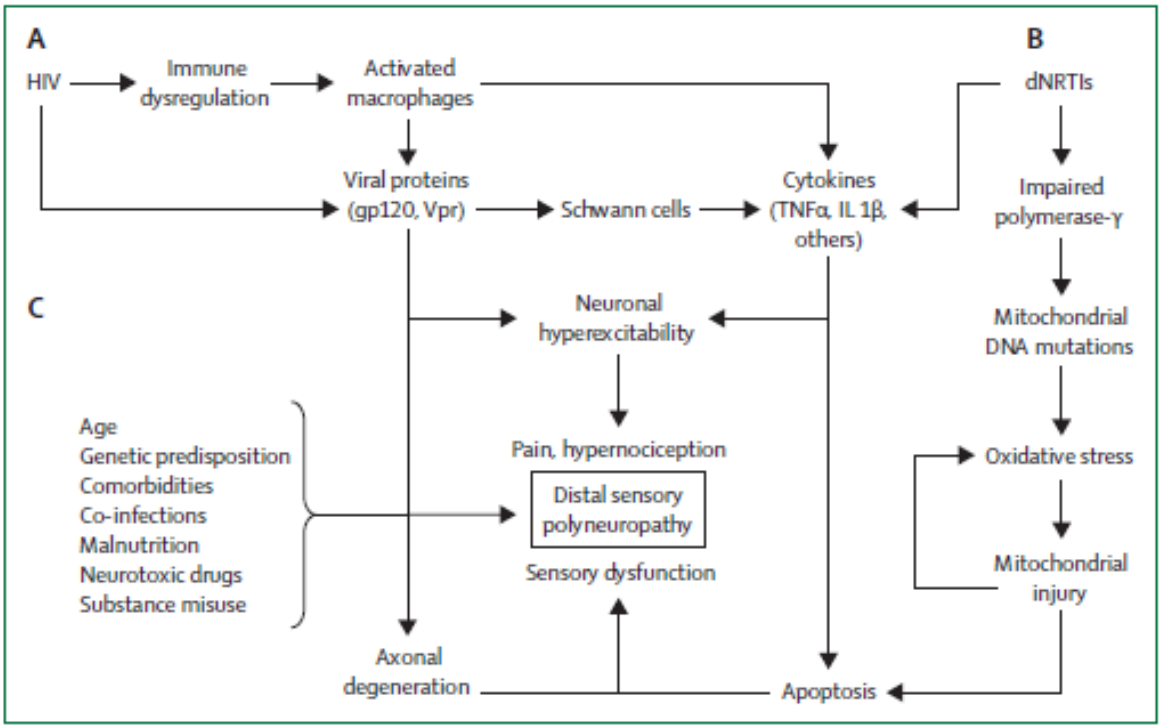
This condition occurs generally in patients with advanced immunosuppression. Studies done in the pre-HAART era revealed that DSP was associated with advancing age(61), high plasma viral load (62)and low CD4 cell counts(59). Recent studies show that there is an association with age but plasma viral load and CD4 cell counts have no association(63). Hence it is postulated that previously reported virologic and immunologic associations of DSP may be affected by cART(63). Also there is preliminary data to suggest that there are ethnic disparities in the clinical manifestations of DSP(64).

Pathogenesis

Nerve biopsies from patients with DSP reveal of axonal degeneration of myelinated and unmyelinated axons. Punch skin biopsies show evidence of reduced intraepidermal nerve fiber density in the distal leg(65). Also dorsal root ganglion (DRG) neuronal loss has been demonstrated in DSP(66). The pathogenesis of DSP is currently unknown. There is no evidence of direct infection or viral replication in

the neurons; however the virus is limited to monocyte/ macrophages. There are inflammatory infiltrates around peripheral nerve fibers and in the DRG consisting of activated macrophages. These activated macrophages release cytokines such as TNF-α, interferon-γ, and IL-6(60). The presence of activated macrophages secreting inflammatory cytokines, rather than the virus itself, seems to account for most of the peripheral nerve damage(67). How activated macrophages penetrate DRG and peripheral nerve fibers is unclear, and it has been hypothesized that the blood-nerve barrier may be affected in HIV-infected patients(60). It has been demonstrated that deposition of TNF-alpha in peripheral nerves correlates with neuropathy(68) . It is postulated that binding of gp120 on the Schwann cell chemokine receptor CXCR4 results in the release of RANTES, which induced dorsal root ganglion neurons to produce tumor necrosis factor-alpha and subsequent TNFR1-mediated neurotoxicity (69). Also by acting directly on axons, gp120 can induce further axonal degeneration independently of inflammatory intermediators(70) Binding of gp120, Vpr, and possibly other viral proteins to neuronal chemokine receptors results in neuronal hyperexcitability and painful symptoms. In a recent study involving a rhesus macaque model for HIV neuropathy, the dorsal root ganglion involvement was studied in SIV-infected CD8 T-lymphocyte-depleted macaques, where activation of endogenous CD68+ macrophages was found to perpetuate the DRG damage and neuronal loss as evidenced by neuronophagia and formation of Nageotte nodules(71).

Figure.1 Pathogenesis of Distal sensory polyneuropathy(21)



Clinical Presentation

DSP is characterized by the progressive onset of symmetric paresthesias, numbness, and painful dysesthesia of the lower extremities. The pain is often described as an aching or burning sensation and is worse on the soles of the feet. Symptoms may remain stable or progress over months or years and ascend in a length-dependent fashion up the legs(8).. Most patients complain of a maximal discomfort when they are barefoot in bed. Therefore, DSP may have a major negative impact on the patient's ability to ambulate and the quality of their sleep. Perception of noxious stimuli, temperature, and vibrations is usually more affected than light touch and proprioception(61). Hyporeflexia of the lower extremities is a very common finding, and gait ataxia with positive Romberg sign is present in severe

cases. Weakness is rarely found on the examination or is confined to the intrinsic foot muscles.

Laboratory Investigations

CSF analysis shows only nonspecific findings with mild elevation of protein concentration and mononuclear pleocytosis, which is common in HIV-1 infection.

Electrophysiologic Studies

Nerve conduction studies (NCS) show low-amplitudes, CMAPs and SNAPs(8). Sensory and motor nerve conduction velocities are normal or only mildly reduced. Electromyographic studies demonstrate acute denervation and chronic re-innervation in distal leg muscles. These findings are consistent with an axonal distal symmetric, predominantly sensory, polyneuropathy(8).

Skin Biopsy

Skin biopsy and Epidermal nerve fiber density(ENFD) have been described as useful diagnostic tools for HIV related DSP(5, 65). Also ENFD correlated well with severity of symptoms and predicted the progression from asymptomatic to symptomatic DSP(72). A leg ENF density of 10 fibres/mm was associated with transition from asymptomatic to symptomatic DSP within the next 6 to 12 months(73).

Nucleoside Neuropathy

DSP as a result of the neurotoxicity of NRTIs zalcitabine (ddC), didanosine (ddI), and stavudine (d4T) has been commonly described(10, 74). The risk is increased in patients using regimens containing a combination of ddI and d4T(75).The clinical presentation and electrophysiologic studies are indistinguishable from DSP. The timing of nucleoside neuropathy is variable. With the discontinuation of the offending medication the pain usually resolve within 8 – 16 weeks, but the signs of neuropathy may remain much longer. However this improvement it is often preceded by a transient worsening of symptoms known as “coasting.”(76)

The pathogenetic mechanism of nucleoside neuropathy appears to be most likely related to nucleoside induced mitochondrial dysfunction; this in turn is mediated through the inhibition of the enzyme γ-DNA polymerase, which is responsible for the replication of mitochondrial DNA. Raised plasma lactic acid concentration an indicator of mitochondrial dysfunction was useful in discriminating between d4T nucleoside neuropathy and DSP with 90% sensitivity and specificity(77). Nucleoside neuropathy occurs more frequently in individuals with preexisting DSP. These data suggest that dNRTI may only exacerbate an inflammatory process triggered by activated macrophages in peripheral nerve fibers or DRG of HIV-infected individuals. In the dorsal root ganglion, dNRTIs are associated with upregulation of chemokines and chemokine receptors, contributing to the inflammatory background. Also mitochondrial abnormalities are much lesser compared to nucleoside neuropathy was seen in neuronal culture with the addition of gp120 alone. Hence it postulated that that there may be synergistic effects between HIV and the dideoxynucleosides on mitochondria.(78). Genetic association studies

have identified genes affecting mitochondrial function and genes involved in the inflammatory response that modify the risk for HIV-SN among patients exposed to neurotoxic antiretrovirals (79)

Co-morbid factors

Multiple comorbid factors may predispose or potentiate distal sensory polyneuropathy. Older age (>40 years) has been identified factor as the most consistent factor (61). Individuals who are tall have Increased risk for both symptomatic and asymptomatic distal sensory polyneuropathy(80, 81). Tall people, have longer peripheral nerves and it has been established that mitochondrial DNA mutations accumulate with increasing distance from the cell body(82). Variations in several genes encoding inflammatory factors and mitochondrial haplogroups are associated with a predisposition for DSP. Associations with advanced HIV infection, lower CD4 cell counts, and high viral loads have been noted, but are not prominent in the post cART era. Diabetes mellitus, a frequent cause of sensory neuropathy in the general population, might increase risk for distal sensory polyneuropathy and can be used to predict the development of symptoms in those with asymptomatic DSP while on cART(81). Also, increased concentrations of serum triglycerides, another component of the metabolic syndrome, has been independently associated with DSP(83). These risk factors are becoming increasingly important as the cART improves survival and the population ages. In HIV-infected people, malabsorption, inadequate nutritional intake, and changed metabolism might lead to micronutrient deficiencies(84) However, till date only vitamin B12 deficiency has been associated with distal sensory polyneuropathy(84). Isoniazid(INH) is a core component of the

Anti-tuberculosis treatment(ATT) regimen and can produce pyridoxine deficiency and a sensory neuropathy very similar to that of DSP(85). HIV-infected patients receiving Isoniazid have a greater risk of developing neuropathy than are TB patients who are not infected with HIV, and these patients can develop INH induced neuropathy despite pyridoxine supplementation, possibly due to pre-existing deficiency or due to a low threshold for neurological injury(86). Also co-infected patients with HIV and tuberculosis can have DSP symptoms even before tuberculosis treatment is started due to unmasking of subclinical distal sensory polyneuropathy. It has been shown that INH may increase the risk for antiretroviral toxic neuropathy(87). Protease inhibitors, such as indinavir, is neurotoxic and might contribute to the development of distal sensory polyneuropathy(88). The use of protease inhibitors increases the odds for DSP only in patients who receive concomitant dNRTIs. Alcohol is another important determinant factor in the pathogenesis of DSP due to its synergistic mitochondrial toxic effect with dNRTIs (89). Multiple substance abuse such as alcohol, cocaine, cannabis, and stimulants may contribute to DSP and the risk increases with the number of substances used(89). Hepatitis C virus infections can cause neuropathy; however, most studies have not shown co-infection with Hepatitis C to be an independent risk factor for DSP(90). DSP is more frequent in patients co-infected with HIV and HTLV-1 and HTLV-2 (91, 92).

Treatment of HIV neuropathy

The treatment of neuropathic pain in DSP is purely symptomatic as the damage to the nerve fibers and DRG is irreversible. Hence therapy is aimed primarily at attenuating the pain and improving the quality of life of these patients. First-line therapies include nonsteroidal anti-inflammatory drugs and acetaminophen but they may not be beneficial in all patients.

Anticonvulsant medications have been used successfully for neuropathic pain in other painful neuropathies and has been found to be useful in HIV related DSP. However medications such as carbamazepine and phenytoin are contraindicated in DSP because both are metabolized by the liver, and may cause unwanted drug interactions. Gabapentin is metabolized by the kidneys and is usually well tolerated by HIV-infected individuals(93). A trial evaluating lamotrigine in HIV positive patients with symptomatic DSP, showed a substantial pain reduction in a subgroup of patients receiving neurotoxic NRTIs but there was no difference compared with placebo in patients with DSP who were not on nucleosides(94).

Amitriptyline, which is commonly used for the treatment of diabetic neuropathy, was not superior to placebo in HIV-infected patients with DSP(95).

Topical therapy for DSP has received a lot of attention recently. The topical application of capsaicin(96) and 5% lidocaine gel(97) have been found to be beneficial. A higher dose of capsaicin has been tried as a transdermal patch and was found successful(98). The mechanism of action of capsaicin has been studied extensively. Application of capsaicin causes an almost complete depletion of the

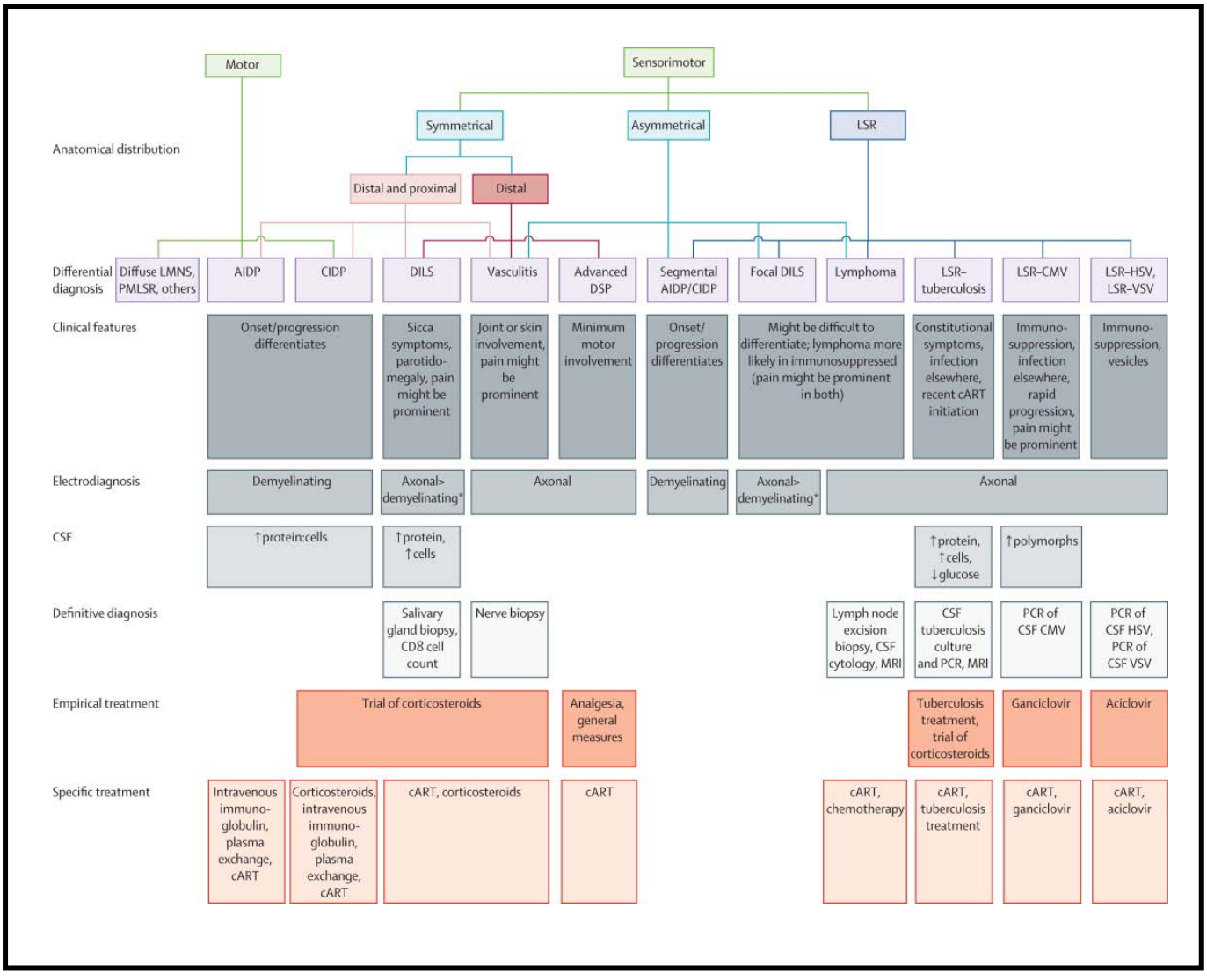
Intra epidermal nerve fibers (IENF), however within the next 27 days there is regeneration and repletion of these fibers. This effect is thought to be mediated by capsaicin stimulating the depletion of substance P, neurokinin, somatostatin, and calcitonin from peripheral nerve fibers, particularly C-fibers (99).

Narcotic analgesics should be kept as last resort because of their addictive potential in the context of a chronic pain syndrome. Tramadol shares properties with opioid analgesics but is less likely to cause dependence and lead to abuse(95). Long-acting opioid agonists such as fentanyl patches should be preferred to short-acting agents. A recent trial looking at Smoked cannabis in HIV associated DSP revealed that smoking cannabis effectively relieved chronic neuropathic pain(100).

Numerous experimental drugs have been disappointing in the treatment of DSP, including mexiletine, peptide T, recombinant human nerve growth factor, plasmapheresis, and acupuncture(101). Depletion of acetyl carnitine, a substrate in the β-oxidation of free fatty acids, was implicated in the pathogenesis of DSP(102),but this was not confirmed in a larger study(103). Newer therapies using neuroimmunophilin ligands and prosaposin are currently under investigation(104). In the mouse model supplementation of uridine was shown to reverse the toxicity of nucleoside antiretroviral drugs however this awaits further clinical research (105). Currently there are no specific prevention measures available for DSP. However provision of multivitamin supplementation to all HIV-infected patients seems prudent. Pyridoxine should be given to patients receiving isoniazid(85). Initiation of cART at CD4 cell counts of more than 200 cells per μL might be protective. Older patients (ie,

those older than 40 years) and those with pre-existing distal sensory polyneuropathy should receive non-neurotoxic cART(81). These patients can be identified through routine clinical screening74 or through a simple questionnaire about neuropathic symptoms(106).

Figure:2 –Clinical Approach to Diagnosis and Management of motor and sensorimotor neuropathies associated with HIV infection



Centner CM, Manifestations of HIV infection in the peripheral nervous system. Lancet Neurol. Mar;12(3):295-309.

PATIENTS AND METHODS

Study Setting:

The study was conducted in Christian Medical College Hospital Vellore, a 1800 bedded academic medical centre in South India. Eligible subjects were recruited from the Infectious Disease Clinic which is a dedicated Outpatient service for People Living with HIV/AIDS (PLHA). The clinic provides comprehensive and holistic care for PLHA. The average attendance is around hundred patients per outpatient clinic.

Study Design:

A prospective cohort study

The study design and methods were approved by the Institutional Review Board of Christian Medical College, Vellore.

Participants

Adult patients (aged 18 years or over) with HIV infection on follow up with the Infectious diseases clinic.

Inclusion Criteria:

Adult patients (> 18 years) with HIV infection on follow up in the ID clinic with the following.

(1) HIV confirmed by dually reactive ELISA test

(2) Subjects were residents of South Indian states (Tamil Nadu, Andhra Pradesh, Kerala and Karnataka

(3) All subjects satisfied the medical eligibility for initiation of antiretroviral therapy (WHO stages III/IV or WHO stage I/II with CD4 counts less than 200 cells / µL.

(4) The Subjects had to be ART naïve(Defined as having received less than four weeks of ART prior to enrolment)

(5) Willingness to participate in the trial

(6) Willing to come for follow up after three months and six months.

Exclusion Criteria:

(1) Patients with diabetes mellitus requiring oral hypoglycaemic agents or insulin

(2) Patients with Vitamin B12 levels < 200 pg/ml.

(3) History of exposure to neurotoxins-

Organophosphates- History of being involved in spraying pesticide,

History of consuming OP any time in the past

Siddha medicines - History of taking Siddha medicines within the past five years

(4) Alcoholism – as defined as greater than 30 drinks per week

(5) History of Hansen's disease in the past as evidenced by patient reporting / documents/ clinical examination

(6) Diagnosed peripheral nerve disease

(7) Patient not willing to participate

Withdrawal criteria:

Patient unwilling to continue participation in the study.

Subject Enrolment

ART-naïve HIV infected adults, eligible for or being initiated on HAART were considered for screening. If the patient fulfilled the necessary criteria for inclusion, then they were approached for informed consent. If the patient consented clinical and demographic data were collected and then the patient underwent a standardised neurological examination with emphasis on peripheral nerve function. All patients underwent Nerve conduction studies (NCS) with standardised anatomical landmarks.

Electrophysiological testing: Median, ulnar and peroneal motor fibers, median and ulnar sensory fibers, superficial peroneal nerves and sural nerves were studied. The compound muscle action potentials (CMAPs) were recorded with surface recording electrodes, which were placed over the main bulk of abductor pollicis brevis, abductor digiti minimi and extensor digitorum brevis for the median, ulnar and peroneal nerves respectively. A bipolar percutaneous stimulator was located at the wrist 7 cm proximal to the active recording electrode for median and ulnar motor NCS. Proximally the median nerve was stimulated just medial to the biceps tendon at the elbow crease and the ulnar nerve was stimulated above the elbow. The stimulation was delivered between the tendons of tibialis anterior and extensor hallicis longus muscle 9 cm proximal to the active recording electrode. A supramaximal stimulation of 0.1 ms duration was delivered for all the motor NCS. F waves were obtained at the distal motor stimulation point and the minimal latency of 10 consecutive stimulations was recorded. Only deflections larger than 50 μV were accepted, to differentiate F waves from background noise. The sensory nerve action potentials (SNAP) were recorded by orthodromic techniques in the upper limbs and antidromic techniques in the in the lower limbs. The stimulating electrode was

placed on the 2nd and the 5th digit for median and ulnar nerves respectively with recording 13 cm proximally from the wrist just medial to the flexor carpi radialis tendon for the median nerve and 11 cm proximally just posterior to the flexor carpi ulnaris tendon for the ulnar nerve. The recording electrode for sural nerve studies was placed behind the lateral malleolus and it was stimulated in the mid-calf 14 cm proximal to the active recording electrode. The recording electrode for superficial peroneal nerve was placed at the level of ankle midway between the edge of the tibia and the tip of the lateral malleolus and the nerve was stimulated by electrodes placed 14 cm proximal to active recording electrode. All SNAP's were recorded using 0.1 ms stimulus duration. Filter settings were 2Hz and 10 kHz for motor studies and 20 Hz and 2 kHz for the sensory studies. The latencies were measured from the onset of the action potential. The amplitudes were measured from peak to peak for both CMAPs as well as SNAPs. The distance between the distal and proximal stimulations was recorded for motor nerve conduction velocity (NCV) determination. Sensory nerve conduction velocities were calculated from the onset latencies. The ground electrode was placed between the stimulation and recording electrodes for all studies. The room temperature was kept at 26 C. SNAPs were classified as abnormal if the measured amplitude was less than 50 % of the lower limits of normal. The normative data used in the diagnosis is given in Table: 6. The Cut off value for superficial peroneal SNAP was taken and 10µV.

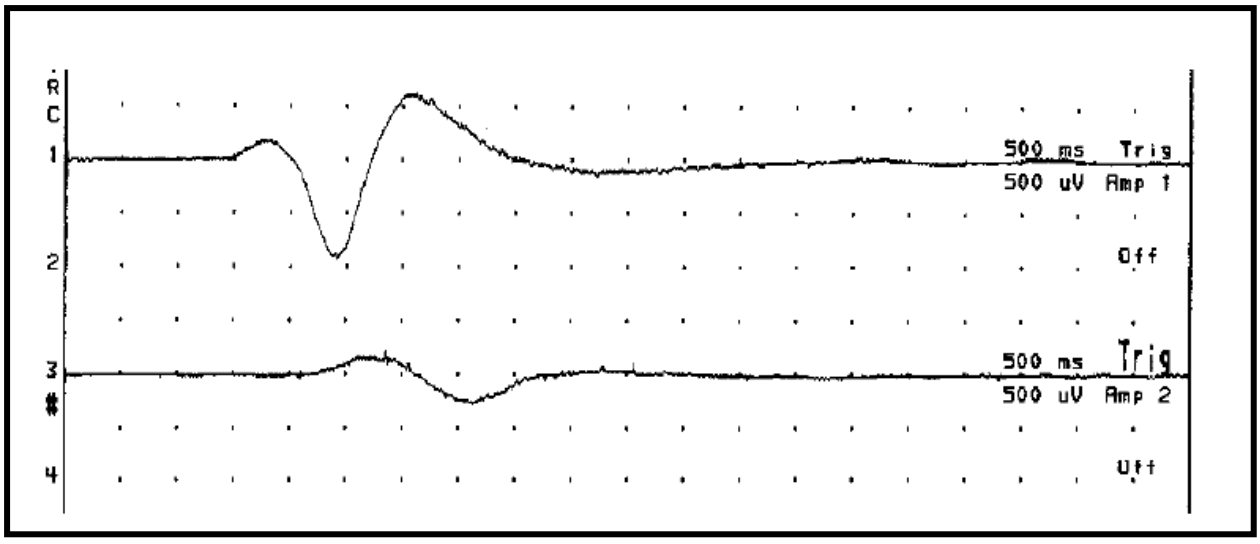
Sympathetic Skin Response

For recording the SSR, the active electrodes were placed in the palm and sole with the reference over the dorsum of the respective body part, after cleaning the skin surfaces and using electrolyte gel. The patient was asked to lie supine and relax.

The low-frequency filter was kept at 0.5 Hz and the high-frequency filter was kept at of 500 Hz. The stimulus was an electrical shock delivered to the median nerve

On the side opposite to the recorded site. The electrical stimulus was applied as a single square pulse, 0.1–0.2 ms in duration. The stimulus intensity ranged between 10 and 30 mA, to get a strong but tolerable response. The amplitude was measured from peak to peak and expressed in microvolt. The response was considered absent if no consistent voltage change occurred using a sensitivity of 50 µV per division after 3 trials at maximum stimuli intensity.

Figure 3: Sympathetic skin response



Typical sympathetic skin response 1- in upper limbs , 3 – in lower limbs

Assessment of symptoms

If the patients were symptomatic, the measure of pain was assessed by the visual analog scale (VAS). The patients were reviewed at three months, six months and then on yearly till March 2013. At this point the detailed neurological evaluation and electrophysiological testing was repeated for all the patients and the Total Neuropathy Score was calculated.

Variables

General

1. Demographic data
2. Baseline anthropometric data – height, weight, body mass index.
3. Baseline CD4 count and serial CD4 counts
4. Plasma viral load (if available)
5. ART regimen being initiated
6. Opportunistic infections in the past and on follow up
7. Drug and treatment history
8. Assessment of adherence and drug toxicity

Assessment of neuropathy

1. Assessment of pain by VAS
2. Detailed neurological examination
3. Conventional nerve conduction studies
4. Sympathetic skin response
5. Total neuropathy score (TNS)

Study outcome

Neuropathy as defined as clinical or electrophysiological evidence of peripheral nerve dysfunction:

1. Sensory symptoms suggestive of peripheral neuropathy
2. Sensory examination suggestive of peripheral neuropathy
3. Tendon reflexes suggestive of a neuropathy
4. SSR if done showing absent response
5. NCV/EMG suggestive of neuropathy

Symptomatic DSP:

A subject is defined as having symptomatic DSP if the sensory symptoms are present and at least two of four remaining key components (sensory function, tendon reflexes, NCV, and SSR) are abnormal, with at least one of the abnormal components being either NCV or SSR.

Asymptomatic DSP: A subject is defined is having Asymptomatic DSP if the sensory symptoms component was normal and at least one of four remaining key components(sensory function, tendon reflexes, NCV, and SSR) were abnormal, with at least one of the abnormal components being either NCV or SSR.

Secondary Outcomes

1. Neuropathy warranting change of antiretroviral therapy regimen
2. Ascending neuromuscular weakness developing after initiation of ART
3. Patient developing Peripheral nervous system involvement other than DSP while on ART as evidenced by clinical and electrophysiological examination
4. Acute inflammatory Demyelinating polyradiculoneuropathy (AIDP) - as diagnosed by standard diagnostic criteria
5. Chronic inflammatory Demyelinating polyradiculoneuropathy (CIDP) as diagnosed by standard diagnostic criteria
6. Immune reconstitution syndrome – presenting with Peripheral nervous system involvement

Analysis:

Data entry was done using SPSS software (version 15.0). Descriptive statistics were calculated using SPSS software. The Chi-Square test was used for the comparison of categorical variables, and the student *t* test was used for the comparison of continuous variables. Odds Ratio (OR) and confidence intervals (CI) were calculated and, 'P' value less than 0.05 was considered statistically significant. Univariate logistic regression analysis was used to determine the risk factors for the development of HIV neuropathy.

RESULTS

Baseline characteristics

A total of 56 consecutive ART naïve patients were screened for neuropathy using clinical and electrophysiological criteria. 16 patients were identified to have evidence of clinical or electrophysiological evidence of peripheral nerve disorders and were excluded from the study. 40 patients who were initiated on cART had normal clinical and electrophysiological finding and were enrolled into the study and followed up for a median period of 59 months.

The baseline characteristics of the patients are as listed below:

The study population comprised of 60% males and 40% females. The mean age of the study population was 37.5 years (mean (S.D), 37.5(±7.4)

Table 1: Age Category

Age Category	Frequency	Percent
20 - 30	8	20.0%
31 - 40	21	52.5%
41 - 50	9	22.5%
51 - 60	2	5.0%
Total	40	100.0%

The mode of acquisition of HIV infection was heterosexual in all the patients. Majority of the patients had advanced stages of HIV infection belonging to either WHO clinical stage III or IV (65%) the distribution was as follows:

Table 2: WHO clinical stage of illness at the time of presentation to I.D clinic

WHO clinical stage	Frequency	Percent
WHO stage I	7	17.5%
WHO stage 2	6	15.0%
WHO stage 3	25	62.5%
WHO stage 4	2	5.0%
Total	40	100.0%

Of the patients enrolled, a larger proportion (66%) were within one year from the diagnosis if HIV infection. Most of the patients were married (90%) and most of them had completed at least primary education (87.5%).

All patients were functionally independent and were employed at the time of enrollment. Fifteen (37.5%) patients, all of whom were males were in the habit of smoking tobacco.

Table 3: Educational status of enrolled patients

Education	Frequency	Percent
Illiterate	5	12.5%
primary school	13	32.5%
secondary school	21	52.5%
college	1	2.5%
Total	**40**	**100.0%**

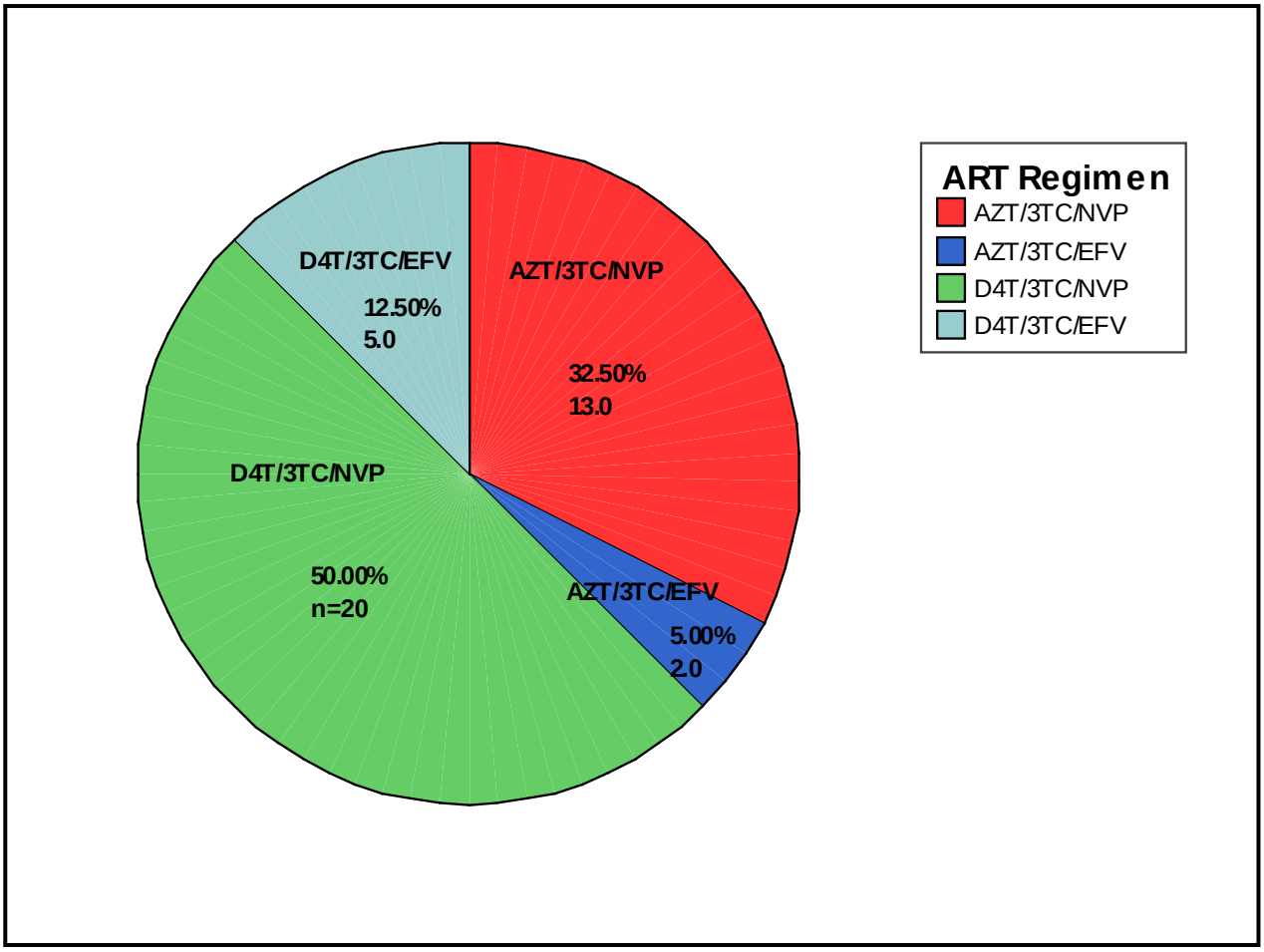
Table 4: Occupation of the enrolled patients

Occupation	Frequency	Percent
Home maker	9	22.%
Manual labourer	15	37%
Driver	6	15%
Agriculture	2	5%
Businessman	8	20%
Total	**40**	**100%**

Baseline CD4 cell counts

The mean CD4 cell count prior to initiation of cART was 165 (± 77.17) cells / µL and the values ranged between 24 to 336 cells / µL. Eight patients (20%) had a baseline CD4 count less than 100 cells / µL.

Figure 4: ART regimen initiated for enrolled patients at I.D.Clinic



Stavudine based regimen was used in 25 (62.5%) patients and Nevirapine based regimen was used in33(82.5 %) patients.

Nine patients (22%) had of tuberculosis and were on ATT at the time of initiation. All patients were on replacement of 10 – 20 mg of pyridoxine daily.

Table 5: Distribution of patients by tuberculosis

Tuberculosis	Frequency	Percent
No history of tuberculosis	31	77.5%
Sputum positive pulmonary tuberculosis	1	2.5%
sputum negative pulmonary tuberculosis	1	2.5%
Disseminated Tuberculosis	1	2.5%
Tuberculosis Meningitis	2	5.0%
Tuberculous Lymphadenitis	4	10.0%
Total	40	100.0%

One patient had pneumocystis jerovici pneumonia and one patient had CMV retinitis. Two patients has chronic diarrhea secondary to Isospora infection.

Baseline Clinical and Neurological Examination

All patients underwent a detailed clinical and Neurological examination. The mean weight of the patients was 54.5(±10.3) and the mean BMI was 20.25 (± 3.2). On mini mental status examination, the mean was 27.5 (±0.8).Three patients had positive sensory symptoms in the glove and stocking pattern. The complaints were of burning paraesthesias over the soles of the feet. There were no autonomic symptoms. There was no sensory ataxia. Except for three patients, all patients had a normal systemic and neurological examination. Sensory loss detected on monofilament and vibrations testing along with hyporeflexia were the abnormal neurological findings detected.

Electrophysiological Characteristics:

All Patients underwent conventional nerve conduction studies of both the median, ulnar, peroneal and sural nerves at the baseline. During follow up all patients had a six monthly clinical examination followed by selective electrophysiological testing for symptomatic patients. All patients had a detailed clinical and electrophysiological testing at the end of the study period. The normative data is as follows.

Table 6: Normative data

Nerve	Distal latency m.sec	Amplitude mV/µV	Conduction velocity M / sec	F wave m.sec
Median motor	3.12 [+/-0.62]	12.0[+/-5.0]	54.9[+/-10.9]	26.6[+/-3.5]
Median sensory	2.27[+/-0.44]	25.6[+/-10.0]	57.4[+/-11.9]	
Ulnar motor	2.17[+/-0.55]	9.0[+/-3.0]	59.4[+/-10.9]	26.6[+/-3.5]
Ulnar sensory	1.8[+/-0.62]	20.4[+/-9.6]	56.4[+/-10.7]	
Peroneal	3.56[+/-1.22]	8.0[+/-2.62]	46.5[+/-7.78]	47.8[+/-5.9]
Sural	2.36[+/-0.62]	8.0[+/-2.62]	48.2[+/-9.8]	

Table 7: Electrophysiological characteristics

Upper limbs		Right		Left	
		Mean	Std. Dev	Mean	Std. Dev
Median Nerve	**Motor (CMAPs)** millivolts	14.9179	4.03080	15.3875	4.61842
	Sensory(SNAPs) Microvolts	30.3393	10.96486	31.1250	10.22486
	Distal Latency (milli seconds)	3.2970	.57745	3.1264	.53002
	F wave Latency (milli seconds)	26.4839	2.26890	26.4250	2.59932
	Cond.Velocity m/s	56.5179	9.60687	56.2607	7.40058
Ulnar Nerve	**Motor (CMAPs)** millivolts	14.2643	3.06122	13.4696	3.18296
	Sensory(SNAPs) Microvolts	25.3214	8.61311	24.5714	8.30741
	Distal Latency (milli seconds)	2.5254	.44012	2.5630	.44150
	F wave Latency (milli seconds)	26.7161	2.41516	26.6321	2.59469
	Cond. Velocity m/s	59.2018	6.69715	59.5839	9.87435

Table 7: continued

Lower Limbs		Right		Left	
		Mean	**Std. Dev**	**Mean**	**Std. Dev**
Peroneal Nerve	**Motor (CMAPs)** millivolts	8.5446	4.20890	8.1268	3.81716
	Distal Latency (milli seconds)	3.3868	.44203	3.4796	.54604
	F wave Latency (milli seconds)	47.4929	5.79755	47.7429	5.98452
	Conduction Velocity m/s	48.2107	5.69008	48.4054	6.86762
Sural Nerve	**Sensory(SNAPs) Microvolts**	26.7321	16.87008	26.0446	14.17240

Types of HIV Neuropathy Based Electrophysiological studies

On screening 56 patients with clinical and electrophysiological testing 13 patients were identified to have a peripheral nerve disorder. Eleven of the thirteen patients (84.6%) had an axonal, length dependent neuropathy and two patients had a mononeuritis multiplex pattern. Two patients had features of carpal tunnel syndrome. The patients with neuropathy that was present prior to initiation of cART were considered to have HIV neuropathy or viral neuropathy and were excluded from further analysis and follow up. On univariate analysis, advanced age, clinical stage of disease and a low CD4 count were identified as risk factors for HIV neuropathy in ART naïve patients being initiated on ART.

Table 8: Types of HIV neuropathy detected on Electrophysiology prior to Initiation of cART (n=56)

Electrophysiological Type	Frequency	Percent
Motor sensory axonal neuropathy	7	53.8%
Sensory neuropathy	2	15.4%
Polyradiculoneuropathy	2	15.4%
Mononeuritis multiplex	2	15.4%
Carpal tunnel syndrome	2	
Total	13	100%

Two of the patients without HIV neuropathies were detected to have an asymptomatic carpal tunnel syndrome (CTS). Both these patients were negative for Hansen's disease but one was detected to be a diabetic on diet. They were clinically euthyroid but thyroid functions were not tested. The patients with CTS were not included in the analysis.

Table 9: Risk factors for DSP amongst cART naïve patients

	Predicting variable	Odds Ratio	95% CI	P value
1	**Age > 40 years**	3.692	1.013 -13.455	0.05
2	**Disease duration > 2 years**	7.425	1.879 - 29.336	0.006
3	**WHO clinical stage 3 or 4**	1.448	1.183 -1.773	0.025
4	**CD4 < 100 cells / µL**	4.407	1.183 -16.414	0.035

A total of 120 median, ulnar and peroneal nerves were studied. The peroneal nerve was the commonest nerve affected, followed by the median and ulnar nerves. There was no differential involvement between the median and ulnar nerves.

Reduction in CMAPS was seen in 11 patients and the reduction in SNAPS was seen in 13 patients. There were no conduction blocks. For patients with electrophysiology suggestive of a polyradiculoneuropathy, the modified Cornblath criterion was used for the diagnosis of CIDP. However none of the patients fulfilled the criteria(107).

The severity of the axonopathy was more in the peroneal nerves than compared to ulnar or median. Of the lower limb nerves tested, the Peroneal was more involved than the tibial nerve. Amongst the thirteen patients with HIV neuropathy eight patients had involvement of the tibial nerves; of these, in five patients the drop in CMAPs was less as compared with the concomitant peroneal nerve. Fifteen patients (27%) had prolongation of the F waves. The prolongation of F waves was seen in 15 % of the upper limbs and 22 % of the lower limbs. Of the sensory nerves tested the sural nerve was more involved than the median and ulnar nerves. The severity of the drop in SNAPs did not correlate with clinical symptoms, duration of disease, CD4 counts or WHO stage of disease. The cohort of 40 patients who were negative for neuropathy and were initiated on cART were followed up six monthly till march 2013.

Assessment on Follow up studies

40 patients were followed up for a mean period of 59 months. Of these two patients expired during the follow up period. One patient died due to septic shock secondary to community acquired pneumonia within the first year after initiating cART and another patient died following an acute abdomen and salmonella septicemia in the third year of follow up. No patient in the study group expired due to any neurological complication.

During the follow up period, the mean CD4 count increased from 165 (± 77.17) cells / µL to 686(± 287) cells / µL. The mean weight of the patients increased from 54.5(±10.3) to 57.8(±10.2) kg. Thirty nine patients(97.5%) had serially increasing CD4 counts and only three patients(7.5%) had a CD4count less than 200 cells / µL at the end of the study period. The three patients with a CD4 count less than 200 cells / µL had documented poor adherence. Twenty three patients (57.5%) had an increase in the weight of at least one kilogram and 4 patients had shown a decrease in the weight. However this did not correlate with the CD4 count.

Adherence: 36 patients had 100 % adherence at all follow up visits. Three patients had 95% and one patient 80% adherence respectively. A persistently low CD4 count of less than 200 correlated positively with poor adherence.

Change in ART regimen

During the follow up period 22 patients (55%) had a change in ART regimen and 3 patients (7.5%) required a second change in the cART regimen. The reason for change was drug toxicity in 17 patients (42.5%). The reason for change within 3 months was associated with a Nevirapine based regimen and the use of Stavudine was associated with a change in cART regimen after one year (p=0.007) . As per the new NACO policy Stavudine has been phased out of the new cART regimens and all patients with long term stavudine use. have been switched to Zidovudine or Tenofovir.

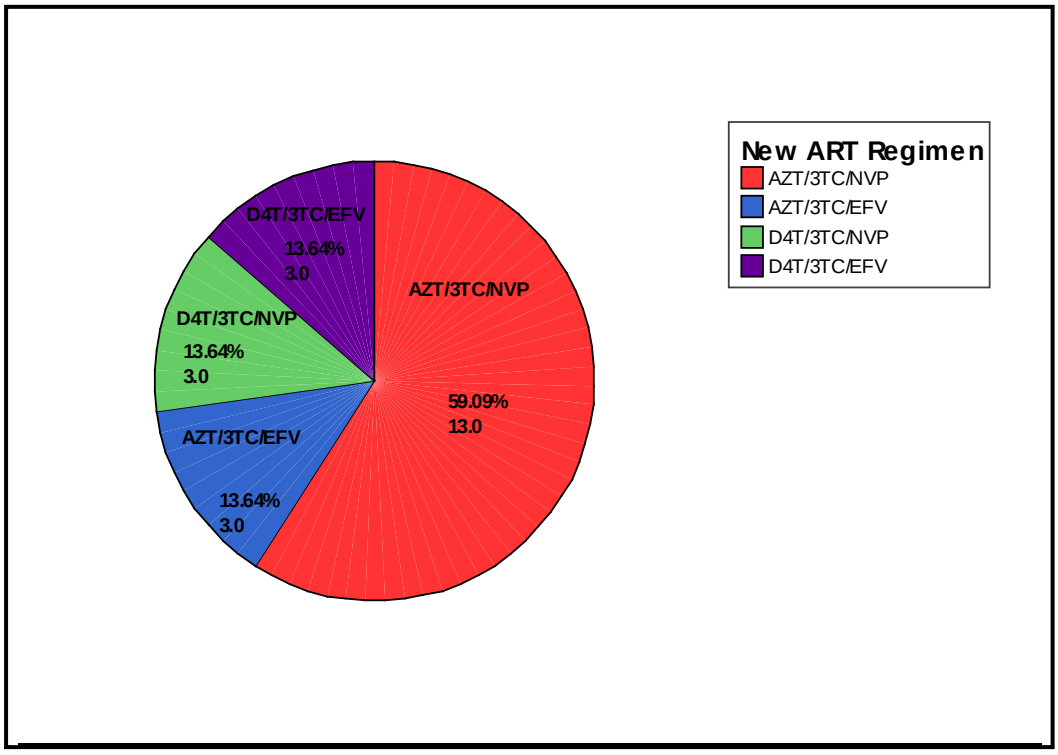
Table 10: Change in ART regimen during follow up

Change in cART Regimen		Frequency	Percent
	cART changed within 3 months	8	20.0%
	cART changed after one year	14	35.0%
	No change in cART regimen	18	45.0%
	Total	40	100.0%

Table 11: Reason for change in the cART regimen during follow up

Reason For Change in cART during follow up		Frequency	Percent
	no change in regimen	18	45.0%
	Lactic acidosis	1	2.5%
	Severe anaemia	1	2.5%
	Nevirpine Induced Drug rash	4	10.0%
	Completed ATT	5	12.5%
	Long term use of Stavudine	11	27.5%
	Total	40	100.0%

Figure 5: New cART regimen during follow up



Neurological assessment on follow up

All forty patients had serial neurological examinations on the following visits.

Two patients expired during the follow up period. One patient died due to septic shock secondary to community acquired pneumonia within the first year after initiating cART and another patient died following an acute abdomen and salmonella septicemia in the third year of follow up. Thirty eight patients were followed up till the end of the study period in March 2013. All followed up patients had repeat electrophysiological studies at the end of the study period. Only twenty eight patients had SSR testing. All patients were scored with the Total Neuropathy Score(TNS). Since QST was not performed, the QST component of TNS was excluded.

OUTCOME

Symptomatic HIV neuropathy was seen in 3 (5.4%) patients and, asymptomatic HIV neuropathy was seen in 13 (23.2%) patients. 40 patients who were negative for neuropathy were followed up for a mean period of 59 months. At the end of the study period a total of 8 (20%) patients developed DSP and 3 (7.5%) patients developed symptomatic DSP.

FIGURE 6 : FLOW CHART SHOWING STUDY OUTCOMES

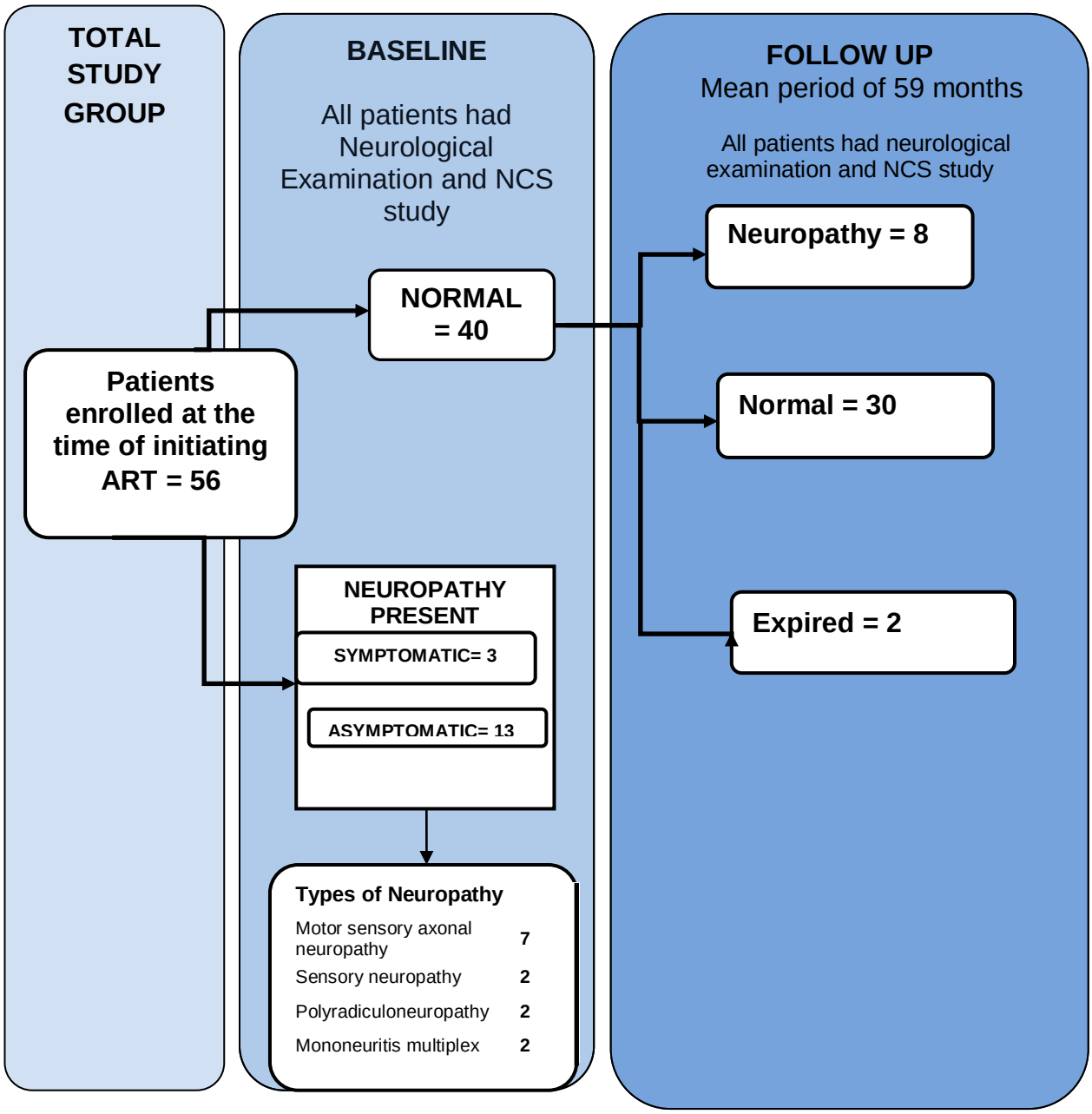


Table 12: Clinical and Electrophysiological parameters in patients with DSP

Patient profile		Clinical Examination			Electrophysiological Testing				Diagnosis			
Patient	symptoms	Loss of pain	Vibration	Reflexes	CMAPs	F Wave	Sural SNAP	S.peroneal SNAP	SSR	TNS	SDSP	DSP
1	present	present	Absent	_	R	prolonged	R	R	Absent	17	Y	Y
2	Absent	Absent	present	++	N	Normal	R	N	present	6	N	Y
3	present	Absent	Absent	+	N	Normal	R	R	Absent	14	Y	Y
4	Absent	Absent	present	++	N	prolonged	R	N	present	4	N	Y
5	present	present	Absent	+	N	Normal	N	N	Absent	8	Y	Y
6	Absent	Absent	present	++	N	Normal	N	R	present	4	N	Y
7	Absent	Absent	present	++	N	Normal	R	R	present	6	N	Y
8	Absent	Absent	present	++	N	Normal	R	R	present	6	N	Y
Total	**3**	**2**	**2**	**3**	**1**	**2**	**6**	**5**	**3**		**3**	**8**

R = Reduced, N= Normal, Y = Yes, N= No

Symptomatic DSP while on cART

Three patients were detected to have a symptomatic DSP during the study period. The patients complained of burning type of paresthesias over the feet. All three patients had impaired vibration sense over the great toes. Two of the patients had graded symmetrical loss of pain sensation below the ankle. The Deep tendon reflexes were absent in one patient and was reduced in the other two. None of the patients had any motor weakness and Romberg's sign was negative in all three. Two of the patients were on a Stavudine based regimen and hence the cART regimen was changed. Two patients with symptomatic DSP had abnormal SNAPs in the Sural or superficial peroneal nerves as well as an abnormal SSR. One patient with DSP had an absent SSR as the only electrophysiological abnormality.

Asymptomatic DSP while on cART

Five patients were detected to have a DSP based on electrophysiological testing alone. All of these patients had a normal neurological examination. Absent or reduced SNAPs in the sural or peroneal nerves was the only electrophysiological abnormality detected.

Electrophysiological characteristics of DSP while on cART

Of the eight patients with DSP the reduction of Sural or superficial peroneal SNAPs was the only consistent abnormality detected. Six patients had abnormal sural SNAPs and six patients had abnormal superficial peroneal SNAPS. Sural SNAPs were more involved than superficial peroneal SNAPs in three patients. One patient had absent SSR as the only electrophysiological abnormality. Only in one patient the superficial peroneal SNAP was more involved than the Sural SNAPs. In three patients (37.5%) mild asymmetry was noted on electrophysiology but there was no correlation with clinical symptoms. Absent SNAPs was associated with symptomatic DSP($p=0.018$). One patient with symptomatic DSP had mild reduction in the peroneal and tibial CMAPs. However there was no associated motor weakness. One of the patients with asymptomatic DSP had a prolongation of bilateral median, peroneal an tibial nerve distal latencies with mild reduction in the conduction velocities. There were no motor conduction blocks. There was prolongation of F – waves in the lower limb nerves. This patient did not fulfil the diagnostic criteria for CIDP by Cornblath et al (108).

Table 13: Electrophysiological characteristics of DSP while on cART

	N	Minimum	Maximum	Mean	Std. Deviation
Right superficial peroneal SNAP	8	.00	23.00	13.6250	8.55
Left superficial peroneal SNAP	8	4.00	21.00	10.7500	6.09
Right Sural SNAP	8	.00	28.00	14.3750	9.04
Left Sural SNAP	8	.00	25.00	11.6250	9.27

Table 14: Abnormal Electrophysiological findings in patients developing DSP while on first line cART

Abnormal Electrophysiological findings in patients with DSP while on cART		Frequency	Percent
	Abnormal SNAPs	7	100%
	Abnormal Sural SNAPs	6	75%
	Abnormal Superficial peroneal SNAP	5	62.5%
	Asymmetrical involvement	3	37.5%
	Sural andSuperficial peroneal equally involved	3	37.5%
	Sural SNAP more involved	3	37.5%
	Superfical peroneal SNAP more involved	1	12.5%
	Absent SNAPs	3	37.5%
	Abnormal F waves	2	25%
	Reduction in CMAPs	1	12.5%
	Absent SSR	3	37.5%
	Multiple Lower limb nerve involvement	1	12.5%

TOTAL NEUROPATHY SCORE

All patients were scored on the Total Neuropathy Score. Eight patients were detected to have abnormal scores. Since QST was not performed on our patients the QST component of the TNS score was excluded. The patients with symptomatic DSP had the highest TNS score (Table 14). A high TNS score was significantly associated with increasing age and neuropathic symptoms (p=0.006). The symptomatic patients had a score of 3 on the VAS pain score.

Table 15: TOTAL NEUROPATHY SCORE

Total neuropathy Score	N	Minimum	Maximum	Mean	Std. Deviation
TNS - Sensory symptoms	8	0	**3**	0.625	1.06
TNS - Motor symptoms	8	0	0	0	0
TNS - Autonomic symptoms	8	0	0	0	0
TNS - Pin sensibility	8	0	2	0.5	0.76
TNS - Vibration sensibility	8	0	2	0.5	0.76
TNS - Strength	8	0	0	0	0
TNS - Tendon reflexes	8	0	2	0.875	0.64
TNS - QST	0				
TNS - sural amplitude	8	2	5	3.125	1.36
TNS - peroneal amplitude	8	2	5	3.375	0.92
Total Neuropathy Score	8	4	17	9.0	4.87

SYMPATHETIC SKIN RESPONE

SSR was done in twenty eight patients (70%). All patients with a diagnosis of DSP had SSR done. SSR was tested in both upper and lower limbs. Of the twenty eight patients tested twenty five were normal and SSR was absent in three patients with DSP. Two patients (67%) with symptomatic DSP had abnormal SNAPs with an absent SSR and one patient with symptomatic DSP (20%) an absent SSR as the only electrophysiological abnormality. Absent SSR was significantly associated with a high TNS score and the development of DSP($p=0.017$). Use of a Stavudine based regimen was associated with an absent SSR($p=0.05$). There was no differential involvement of the lower limbs as compared with the upper limbs.

Risk Factors for DSP

On univariate analysis the development of DSP was associated with an age greater than 40 ($p=0.018$) and a male sex($p=0.052$). There was no association between the duration of disease, WHO stage, initial CD4 count or baseline BMI. However the failure to demonstrate a weight gain and a loss of weight was associated with the development of DSP($p=0.05$). There was no association between the cART regimen and the development of DSP. Stavudine use was not significantly associated with

the development of DSP. However stavudine use was associated with an absent SSR(p=0.05). A CD4 cell count of less than 500 was associated with the development of DSP(p=0.04). There was no association between the use of an INH based ATT regimen and development of DSP. There was no association between the duration of disease and DSP. Since the number of outcomes was small multivariate analysis was not performed.

Discussion

This study reveals a relatively low prevalence of DSP, in both the cross sectional cART naïve South Indian adults with advanced HIV infection as well the prospective cohort of South Indian adults followed up while on cART.

At the time of enrollment, 23.2% of the ART naïve patients being screened had a HIV associated DSP, but only 5.4% had symptomatic HIV associated DSP. The prevalence of HIV neuropathy by this study is much lower as compared to the study by Cherry et al, which described the prevalence of HIV neuropathy as 55%(7). In a study from the United States of America (USA) Shifitto et al found that 20 % of their patients had Asymptomatic HIV neuropathy and 35 % had symptomatic HIV neuropathy (59). Our finding of the prevalence of asymptomatic HIV neuropathy is similar to that of western data. However the prevalence of symptomatic DSP is much lower compared to western studies. Other studies from India have found similar prevalence of symptomatic HIV neuropathy. Wadia et al reported a prevalence of 5.6% for HIV neuropathy detected by clinical examination(16). In a study from CMC Vellore on PLHA receiving first line cART, Ajit Sivadasan et al, identified symptomatic HIV neuropathy warranting change of ART regimen in 5.2%(109). Studies from Africa and Asia- pacific regions reveal a similar trend as seen in India. Beadles et al, in a study from Malawi reported a prevalence of 13 % and Wright et al reported a prevalence of 19.7% from the Asia pacific counties.(110, 111). In Australia however, despite its geographical proximity to the Asia-pacific, Smyth et al report a high, 42 % prevalence of HIV neuropathy (112). The differences we see in the prevalence of symptomatic HIV neuropathy is possibly

due to the differences in the study setting, differing age distribution , co morbid illnesses, substance abuse , concurrent use of D4T based ART regimen and probably ethnicity(63). There is increasing evidence that ethnicity could be a possible risk factor for the development of HIV neuropathy(63, 64, 111). This could possibly explain a relatively low prevalence of HIV neuropathy seen in countries with predominantly non-Caucasian population such India, Africa and the Asia-pacific region. In countries with a significant Caucasian population the incidence is relatively high such as the United States and Australia (7, 8, 112). Robinson-Papp et al studied differences in the prevalence of HIV neuropathy amongst non-Hispanic white, Hispanic, and African American PLHA and detected Hispanics to be more susceptible along with higher pain scores(64). This suggests that there are ethnic disparities in the clinical manifestations of HIV-related neuropathies including pain and the susceptibility to Neurotoxic cART. Mitochondrial DNA haplogroup polymorphisms and proinflammatory cytokine genes have been identified as the possible genetic basis for these ethnic differences in the prevalence of HIV neuropathy and nucleoside neuropathy (113-115). The carriage of a cytokine TNF alpha polymorphism such as TNFA-1031*2 was detected to have a higher risk for the development of nucleoside neuropathy. Also the carriage of IL12B (3' UTR)*2 had protective role in preventing Nucleoside neuropathy(114). Polymorphisms of mitochondrial haplogroup T namely T:MTND2*LHON4917G that was associated with the development of nucleoside neuropathy(115). Variations of the hemochromatosis gene has also been studied, and the genotype HFE C282Y was found to have a lower risk for developing nucleoside neuropathy (114, 116).

All the patients in our study were from an outpatient setting, and had a lower mean age as compared to western studies. Co-morbidities such as diabetes

and substance abuse including alcohol were excluded. At the baseline all the patients were ART naïve. These factors could be the possible reasons for reporting a lower rate of HIV neuropathy in our study. Also this difference could be contributed by the differences in the assessment methods. In our study only conventional nerve conduction studies (NCS) were performed on all patients. Sympathetic skin response was done for a majority of patients. QST was not done due to technical difficulties. Though epidermal nerve fiber density(ENFD) is a proven tool to assess HIV related DSP it was not included in our assessment due to its non availability in our centre (65, 117). Hence compared to studies that used QST and ENFD for detecting HIV neuropathy, our study using only NCS, could have differing results in view of different assessment methods.

At the time of initial screening and enrollment, patients detected to have a neuropathy were found to an axonal length dependent neuropathy. Of the three patients with symptomatic DSP prior to initiation of cART all had a motor sensory axonal neuropathy. The presence of symptoms did not correlate with age, duration of disease, CD4 counts, WHO stage and severity of axonopathy. Of the thirteen patients with asymptomatic HIV neuropathy, seven patients had both motor and sensory involvement, while two had only sensory involvement. This pattern of involvement is similar to that described in literature(118-121). On testing of motor parameters, the peroneal nerve was the commonest nerve affected, followed by the median and ulnar nerves. In the Upper limbs there was no difference between the involvement of the median and ulnar nerves. However in the lower limbs the peroneal nerves were more involved.

F waves are known to be prolonged in patients with HIV infection(118). In this study too, patients with HIV neuropathy had prolonged F waves. The lower limbs were more affected as described in other NCS studies(118). Abnormalities of F-waves have been identified as early features of DSP such as diabetic polyneuropathy(122) The measurement of F wave duration($F\text{-}_{dur}$) is useful in identifying early diabetic polyneuropathies and may be used in the setting of early HIV neuropathy(122).Of the upper limb nerves studied both the median and ulnar nerves were equally involved except for two patients who had a mononeuritis multiplex pattern of involvement. The nerves involved were median, ulnar and peroneal nerves. Mononeuritis multiplex in HIV infection is seen commonly in disseminated CMV disease and less commonly Hansen's disease, Vasculitis, cryoglobulins, and Hepatitis B infection(123-127). Though both our patients did not have Hansen's disease, one patient was found to have co-infection with hepatitis B virus. There was no evidence of CMV retinitis or colitis in both patients. The patients however were clinically asymptomatic and showed no neurological progression. Hence further etiological work up was not done. Two patients with out evidence of HIV neuropathy had asymptomatic carpal tunnel syndrome, however our patients were not on a protease inhibitor. One patient was detected to be a diabetic on diet. Carpal tunnel syndrome has been described in patients with HIV infection and it is postulated that there could be an association with concomitant use of protease inhibitors (128-130).

On sensory testing, the lower limbs were more affected than the upper limbs; as suggested by the sural nerves being more affected than the median and ulnar nerves; both in terms of numbers affected as well as severity. The severity of the drop in SNAPs did not correlate with the presence of symptoms or other

identified risk factors. In our study we found that on univariate analysis Low CD4 cell count, advancing age, duration of disease and clinical stage of disease were identified as risk factors. However on multivariate analysis the association with low CD4 cell count was not significant when it was adjusted for other risk factors In pre–HAART era studies, the risk factors for HIV neuropathy were advancing age, severity of immunosuppression, low CD4 cell counts and increased HIV plasma viral loads(62, 131). However recent studies have shown no such correlations with CD4 cell counts and plasma viral load(63). Advancing age and substance abuse disorders were detected as risk factors(63). Concurrent use of ATT (isoniazid based) was postulated to be a risk factor, however there was no association detected in our study. Patients with alcohol abuse were excluded, there were no patients with substance abuse and Plasma viral load was not done routinely, hence these factors could not be explored.

All enrolled patients were initiated on first line HAART as per NACO guidelines. A Stavudine based regimen was used in 62.5% of the patients and Nevirapine was used as the NNRTI in 82.5% of the patients. During the median follow up period of 59 months 55% had a change in ART regimen of which 42.4% was attributed to drug toxicity. The incidence of regimen change as per our study is much higher when compared to other similar studies in India. Kumarasamy et al found that 20% of their patients on first line generic ART had a regimen change(17). In a study from CMC vellore, Ajith Sivadasan et al found that during a median follow up period of 48 weeks 27 % of the patients receiving first line generic ART developed a severe adverse drug reaction(ADR) requiring a change in ART regimen. This higher proportion of regimen change could be attributed to the longer follow up

period of 59 months in our study as well the policy of switching over from Stavudine to Zidovudine or Tenofovir in patients with long term use of Stavudine.

During the follow up period of 59 months eight patients 20% were detected to have a DSP of these three patients (7.5%) were detected to have symptomatic DSP. The period prevalence of symptomatic DSP while on cART as measured by our study is similar to the studies reported in literature. In India in a cohort of 3154 South Indian PLHA on generic cART, of whom 54.8% was on a stavudine based regimen, Kumarasamy et al found the prevalence of peripheral neuropathy was 9 %(132). The use of stavudine was identified as a risk factor for peripheral neuropathy. In a study by van Griensven in Rwanda the prevalence of clinically detected, symptomatic cART associated neuropathy was 8% (133). Though the methods of assessing DSP in various studies are different, the prevalence of symptomatic DSP while on cART as estimated in our study is consistent with that published in literature. However the total period prevalence of DSP associated with cART of 20 % over a mean period of 59 months is much lower than that reported in literature. This could be contributed partly by the timely switching over of Stavudine to Zidovudine or Tenofovir, in patients who have been on long term Stavudine in accordance with the current WHO and NACO guidelines. Since epidermal nerve fibre density which is more a sensitive tool than electrophysiological testing that was used in our study for the diagnosis of DSP, a low estimate in our study could be contributed by this. Also this low prevalence of DSP in our study could be attributed to the protective effect of ethnicity; as a low prevalence of both symptomatic and asymptomatic DSP has been reported in the non-Caucasian populations (111). On electrophysiological testing the reduction of SNAPs in the Sural and superficial peroneal nerves was the most consistent

findings. One of the patients had a prolongation of the median, peroneal and tibial nerve distal latencies, prolongation of F –waves in the lower limbs and mild reduction in the conduction velocities. However she did not fulfil the Cornblath criteria for CIDP. One patient with symptomatic DSP had mild reduction in the peroneal CMAPs. Of the sensory nerve abnormalities, there was involvement of both sural and superficial peroneal nerves. Three patients with DSP had equal involvement of both sural and Superfical peroneal nerves and three patients had more involvement of the sural nerves. Only one patient had more involvement of the superficial peroneal SNAPs. This is consistent with the increase in yield in utilising the superficial peroneal SNAPs in the diagnosis of DSP(134). Total neuropathy score(TNS) is a validated score in the assessment of DSP. TNS scores were abnormal in all our patients with DSP(135). Since QST was not performed on our patients the QST component of the TNS score was excluded. A high TNS score was predictive of symptomatic DSP as well as an absent SSR. It is postulated that HIV neuropathy preferentially affects myelinated fibres and anti-retroviral therapy affects unmyelinated fibers(136). Sympathetic skin response(SSR) is a good tool to assess the function of small unmyelinated fibers and SSR is widely used as an adjunctive electrophysiological test for the assessment of peripheral neuropathy with involvement of small fibers(137). The use of SSR was comparable to that of QST and other techniques such as nociceptive evoked potentials and current perception threshold(CPT)(138, 139). SSR has been used in the diagnosis of nucleoside neuropathy(140). In our study of the twenty eight patients who underwent SSR, three of the patients with DSP had an absent SSR. Of these, two patients had symptomatic DSP. There was no differential involvement of SSR on comparing the the upper and lower limbs. All three patients had an absent SSR in both upper limbs

and lower limbs. Though SSR in the lower limbs is more commonly absent in axonal neuropathies such and HIV and diabetes, a concomitantly absent SSR in both upper and lower limbs is also a common finding, as seen in our study(141, 142). The absent SSR was associated significantly with symptomatic DSP. Also the absent SSR was associated with the use of a Stavudine based regimen. This is consistent with the hypothesis that anti-retroviral therapy affects unmyelinated fibres as assessed by the SSR(140). The risk factors for the development of DSP while on cART detected in our study were, age greater than 40, a persistently low CD4 count of less than 500, and weight loss while on cART. . Though there was no association of DSP while on cART with use of a Stavudine based regimen, and absent SSR was associated with Stavudine use. Though the use of INH as part of ATT regimen has been associated with the development of DSP; there was no association that was demonstrated.

The major limitations in our study include

1. Only conventional NCS (with a diagnostic yield of only 60%) was used for the diagnosis of asymptomatic HIV neuropathy; QST and ENFD were not done due to technical difficulties.
2. Baseline plasma viral load and follow up CD4 cell counts were not available for all patients; hence it could not be used for analysis.
3. SSR was not done at baseline and could not be done for all follow up patients
4. Since QST was not performed the QST component of the TNS could not be assessed
5. Repeat NCS was not serially available for all patients during follow up visits; hence the incidence of asymptomatic DSP could not be studied.

6. Since the number of patients with DSP was small multivariate analysis could not be performed

Conclusion

1. Of the fifty six cART naive HIV positive patients screened 23.2% of the ART were detected to have DSP.

2. The prevalence of symptomatic DSP amongst cART naïve patients with HIV was detected to be 5.4%.

3. Low baseline CD4 cell count, advancing age, increasing duration of disease and advanced clinical stage of disease were identified as risk factors for DSP amongst the cART naive patients.

4. During the follow up of forty patients on first line generic cART over a period of 59 months eight patients 20% were detected to have a DSP

5. The prevalence of symptomatic DSP while on first line cART was found to be 7.5%.

6. The risk factors for the development of DSP while on cART were an age greater than 40, a persistently low CD4 count of less than 500 and weight loss while on cART. Absent SSR was associated with symptomatic DSP as well exposure to a Stavudine based cART regimen.

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ANNEXURES

DATA COLLECTION PROFORMA

HIV NEUROPATHY

Name:	**Address:**
Hospital Number:	**Telephone/E-mail:**
DOB: **Age:**	**Seen by:**
M/F	**Date:** **Time:**
	Serial number

CD 4 count	Date	viral load	Date

Co-morbidities :

Hypertension	Y☐/ N☐	Diabetes	Y☐/ N☐
Smoking	Y☐/ N☐	Hypercholesterolaemia	Y☐/ N☐
IHD	Y☐/ N☐	Alcohol	Y☐/ N☐
PVD	Y☐/ N☐	Obesity	Y☐/ N☐
Chronic diarrhoea	Y☐/ N ☐	Organo phos exp	Y☐/ N☐
Renal failure	Y☐/ N☐	Vegetarian	Y☐/ N☐
Native medication	Y☐/ N☐	Other toxins	Y☐/ N☐

Coding for Sensory Symptoms

Sensory Parasthesia	1 .Symptoms limited to fingers or toes	2 .Symptoms extend to ankle or wrist	3. Symptoms extend to knee or elbow	4. Symptoms above knees or elbows, or functionally disabling
Sensory loss	1 Symptoms limited to fingers or toes	2 Symptoms extend to ankle or wrist	3 Symptoms extend to knee or elbow	4 Symptoms above knees or elbows, or functionally disabling
pain	1 .Symptoms limited to fingers or toes	2 .Symptoms extend to ankle or wrist	3. Symptoms extend to knee or elbow	4. Symptoms above knees or elbows, or functionally disabling
Type of pain	1 Burning type	2 Pricking type		
Motor	1 Difficulty in hand grip	2 Difficulty in combing, reaching up to shelf	3 Difficulty in turning in bed	4 Bulbar symptoms
	5 Difficulty in gripping foot wear, footwear slipping off with knowledge	6 Twisting of ankle, buckling of knee	7 Difficulty in getting up from squat	8 Complete paralysis
Bladder	0 absent	1 present		

Symptoms Duration of symptoms:

	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Paresthesias						
Pain						
Pain type						
Sensory loss						
Motor						
Bladder						

Opportunistic infection in the past

Pulmonary tuberculosis ☐ **Time of dx :** **Duration of Rx:**
Extapulmonary tuberculous ☐ **Time of dx :** **Duration of Rx:** **site:**
PCP pneumonia ☐
CMV retinitis ☐
Others ☐ Details :

General Examination:

Temp: Pulse: reg/irreg

Blood pressure: lying/ sitting/ standing/Height: Weight: BMI :

CVS Abdo: Chest:

0 = Normal , I = Abnormal

	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Gen exam						
Weight						
CVS						
RS						
ABDO						

Neurological examination:

The Mini-Mental Status Examination (MMSE)	**Points**
Orientation Name: season/date/day/month/year Name: hospital/floor/town/state/country	 5 (1 for each name) 5 (1 for each name)
Registration Identify three objects by name and ask patient to repeat	 3 (1 for each object)
Attention and calculation Serial 7s; subtract from 100 (e.g., 93-86-79-72-65)	 5 (1 for each subtraction)
Recall Recall the three objects presented earlier	 3 (1 for each object)
Language Name pencil and watch Repeat ‘‘No ifs, ands, or buts’’ Follow a 3-step command (e.g., ‘‘Take this paper, fold it in half, and place it on the table’’) Write ‘‘close your eyes’’ and ask patient to obey written command Ask patient to write a sentence Ask patient to copy a design (e.g., intersecting pentagons)	 2 (1 for each object) 1 3 (1 for each command) 1 1 1
TOTAL	

MMSE	**Visit 1**	**Visit 2**	**Visit 3**	**Visit 4**	**Visit 5**	**Visit 6**
OrientTime						
Orien Place						
Registration						
Attention						
Recall						
Naming						
Repetiton						
Commands						
Writ comnd						
Sentence						
Design						
TOTAL						

Motor Examination

Bulk and Tone

	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Wasting						
Tone						

0 = Normal, 1 = Decreased , 3 Increased

Power

	Visit 1		Visit 2		Visit 3		Visit 4		Visit 5		Visit 6	
Power	R	L	R	L	R	L	R	L	R	L	R	L
Neck flx												
Neck ext												
Trunk												
Should Abd												
Should Add												
Elbow Flx												
Elbow Ext												
Wrist Flx												
Wrist Ext												
Hip Flx												
Hip Ext												
Knee Flx												
Knee Ext												
Dorsiflx												
Plantar												

MRC Scale

0 No contraction
1 Flicker or trace of contraction
2 Active Movement with gravity eliminated
3 Active Movement Against gravity
4 Active Movement Against gravity & resistance
5Normal power

Reflexes

	Visit 1		Visit 2		Visit 3		Visit 4		Visit 5		Visit 6	
Reflexes	R	L	R	L	R	L	R	L	R	L	R	L
Biceps												
Brachiorad												
Triceps												
Knee												
Ankle												
Sup abd												
Plantar												

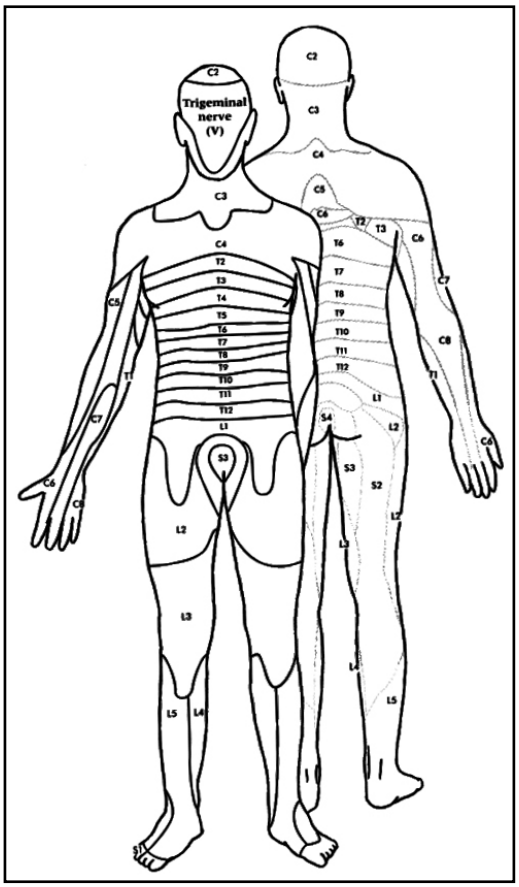
Reflex Grading

0 Absent
+/- Present with reinforcement
\+ Decreased
++ Normal
+++ Increased
C With clonus

Sensory examination

		Visit 1		Visit 2		Visit 3		Visit 4		Visit 5		Visit 6	
	Sensory	R	L	R	L	R	L	R	L	R	L	R	L
Up.Limb	**Fine touch**												
	Vibration												
	Temperature												
	Joint pos												
	Monofilamnt												
Lo.Limb	**Fine touch**												
	Vibration												
	Temperature												
	Joint pos												
	Monofilamnt												

0 = Normal , 1 = Abnormal (quantify sensory loss in % 25/ 50 / 75/ 100)



shade areas with sensory loss

Cerebellar and Gait

	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit6
Cerebel						
Romber						
Gait						
Nk stif						

0 = Normal, 1 = Abnormal

Electrophysiology

	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit6
NCV						
EMG						
QST						
END						

0 = Normal, 1 = Abnormal

Type of Neuropathy : Nil / DSP/ AIDP/CIDP

Investigations

	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Hb						
TC						
DC						
Platelets						
Lipids						
AC						
PC						
Creat						
Vitamin B 12						

ANTIRETROVIRAL THERAPY :

ART Regimen : AZT / 3TC / NVP ☐ Details

AZT / 3TC / EFV ☐

D4T/ 3TC / NVP ☐

D4T/ 3TC / EFV ☐

Others ☐

Adherence

	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Adherence						
Pill count						

Adverse events

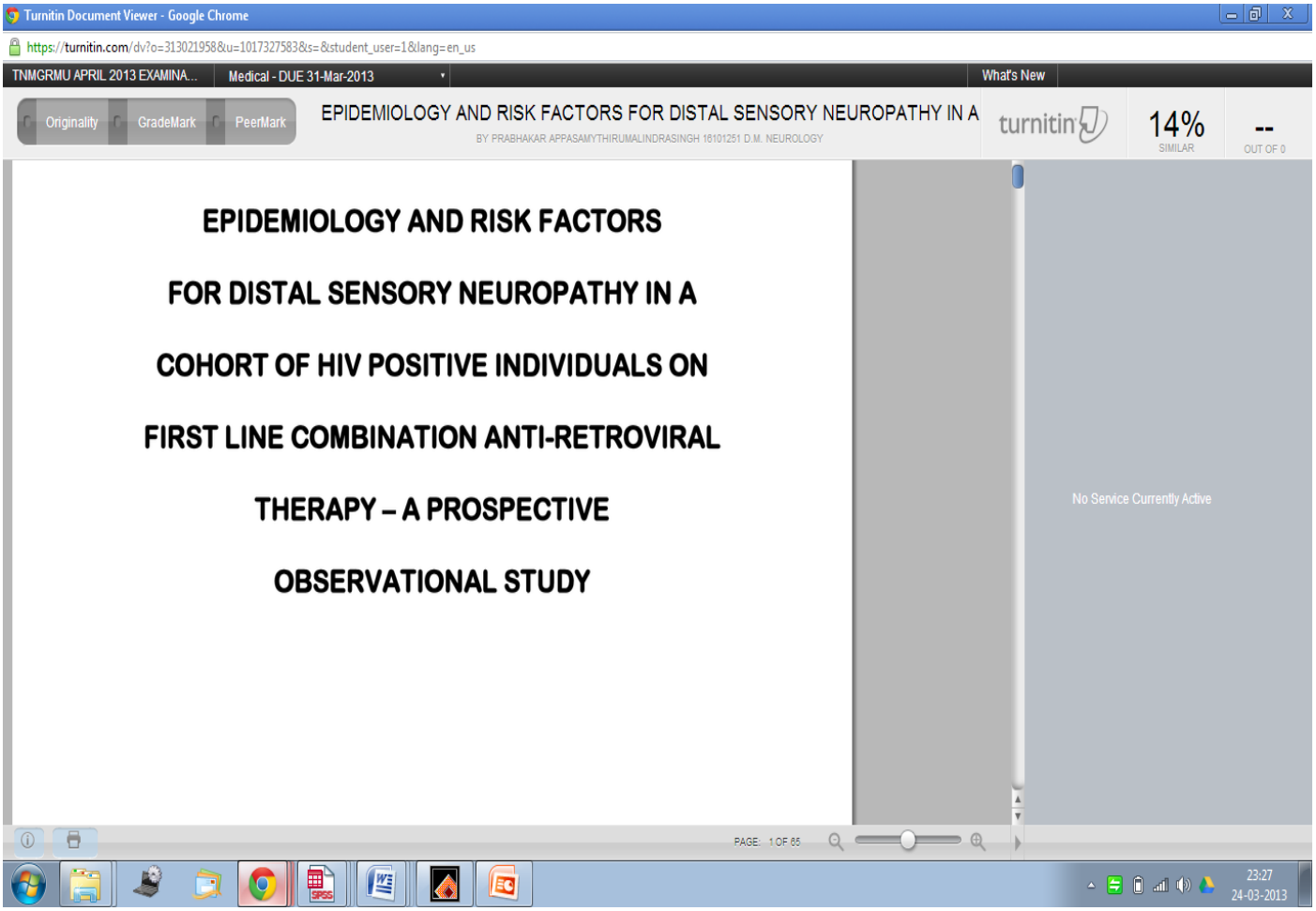
	Visit 1	Visit 2	Visit 3	Visit 4	Visit 5	Visit 6
Neurological #						
Skin rash						
Gastro int						
Bonemarrow						
Metabolic						
Others						

-other than DSP 0 = Normal , 1 = Present

Change in ART regimen	Reason for change	Date

TOTAL NEUROPATHY SCORE

Parameter	Score				
	0	**1**	**2**	**3**	**4**
QST = quantitative sensory test; ULN = upper limit of normal; LLN = lower limit of normal.					
Sensory symptoms	None	Symptoms limited to fingers or toes	Symptoms extend to ankle or wrist	Symptoms extend to knee or elbow	Symptoms above knees or elbows, or functionally disabling
Motor symptoms	None	Slight difficulty	Moderate difficulty	Require help/assistance	Paralysis
Autonomic symptoms, n	0	1	2	3	4 or 5
Pin sensibility	Normal	Reduced in fingers/toes	Reduced up to wrist/ankle	Reduced up to elbow/knee	Reduced to above elbow/knee
Vibration sensibility	Normal	Reduced in fingers/toes	Reduced up to wrist/ankle	Reduced up to elbow/knee	Reduced to above elbow/knee
Strength	Normal	Mild weakness	Moderate weakness	Severe weakness	Paralysis
Tendon reflexes	Normal	Ankle reflex reduced	Ankle reflex absent	Ankle reflex absent, others reduced	All reflexes absent
Vibration sensation (QST vibration)	Normal to 125% ULN	126 to 150% ULN	151 to 200% ULN	201 to 300% ULN	>300% ULN
Sural amplitude	Normal/reduced to <5% LLN	76 to 95% of LLN	51 to 75% of LLN	26 to 50% of LLN	0 to 25% of LLN
Peroneal amplitude	Normal/reduced to <5% LLN	76 to 95% of LLN	51 to 75% of LLN	26 to 50% of LLN	0 to 25% of LLN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EPIDEMIOLOGY AND RISK FACTORS FOR DISTAL SENSORY NEUROPATHY IN A
BY PRABHAKAR APPASAMYTHIRUMALINDRASINGH 16101251 D.M. NEUROLOGY
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EPIDEMIOLOGY AND RISK FACTORS
FOR DISTAL SENSORY NEUROPATHY IN A
COHORT OF HIV POSITIVE INDIVIDUALS ON
FIRST LINE COMBINATION ANTI-RETROVIRAL
THERAPY – A PROSPECTIVE
OBSERVATIONAL STUDY
No Service Currently Active
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24-03-2013

KEY TO MASTER CHART

	Variable Name	Value	Label
1	**Sex**	1	Male
		2	Female
2	**Durattion of HIV infection**	0	< 2 years
		1	> 2 years
3	**Marital Status**	0	Single
		1	Married
4	**Occupation**	0	House wife
		1	Manual Laborer
		2	Driver
		3	Farmer
		4	Business
		5	Office
5	**Educational Status**	0	Illiterate
		1	Primary school
		2	Secondary school
		3	Graduate
		4	Post graduate
		5	Literate
6	**WHO Stage**	1	WHO stage I
		2	WHO stage II
		3	WHO stage III
		4	WHO stage IV
7	**Tuberculosis**	0	No history of tuberculosis
		1	Sputum positve pulmonary tuberculosis
		2	Sputum negative pulmonary tuberculosis
		3	Disseminated Tuberculosis
		4	Tuberculosis Meningitis
		5	Tuberculous Lymphadenitis
8	**ART**	1	AZT/3TC/NVP
		2	AZT/3TC/EFV
		3	D4T/3TC/NVP
		4	D4T/3TC/EFV
9	**HIV neuropathy**	0	No evidence of neuropathy
		1	HIV Neuropathy present
10	**Others**	0	Absent
		1	Present

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	SNO	ARTnu	cARTneurop	sympDSP	SSR	Name	HospNo	Adress	TelNo	Age	a40	ag	Sex	DoFv	DoDx
2	48	335	1.00	1.00	1.00	Vijayakumar	398020D	Vellore	#NULL!	34	0	2	1	28-Jan-2009	27-Jan-2009
3	30	284	1.00	1.00	1.00	Sarangan	366324D	Walajapet	9,994,790,544	41	1	3	1	17-Dec-2008	02-Dec-2008
4	51	380	1.00	1.00	1.00	Rani	787474D	Chittoor	9,490,277,228	37	0	2	1	01-Mar-2009	09-Sep-2005
5	18	245	1.00	0.00	0.00	Ponnuswamy	347204D	Vellore	9,443,430,033	47	1	3	1	12-Nov-2008	20-Mar-2008
6	11	204	1.00	0.00	0.00	Latha	235949D	Gudiyatham	#NULL!	42	1	3	2	23-Jul-2008	09-May-2008
7	56	269	1.00	0.00	0.00	Gowri	356955D	Arni	#NULL!	35	0	2	2	27-Nov-2008	17-Nov-2008
8	19	244	1.00	0.00	0.00	Basha.S.M	336087D	Chittoor	9,291,600,634	60	1	4	1	19-Oct-2009	29-Jun-2006
9	47	364	1.00	0.00	0.00	Arumugam	414611D	Vellore	9,843,165,563	38	0	2	1	11-Mar-2009	24-Dec-2008
10	21	246	0.00	0.00	0.00	Venkatesan.G	022667D	Vellore	9,448,089,968	35	0	2	1	15-Sep-2008	08-May-2007
11	55	435	0.00	0.00	0.00	Venkatesan	460033D	Vellore	9,677,842,433	43	1	3	1	19-May-2009	12-May-2009
12	2	182	0.00	0.00	0.00	Usha.K	306318D	chitoor	8,573,200,336	40	0	2	2	10-Sep-2008	01-Sep-2008
13	14	208	0.00	0.00	0.00	Umapathi	314839D	Arcot	9,443,430,016	40	1	2	1	15-Oct-2008	17-Sep-2008
14	27	314	0.00	0.00	0.00	Sudhakar Babu	300780D	Vellore	#NULL!	29	0	1	1	08-Oct-2008	27-Aug-2008
15	40	415	0.00	0.00	0.00	Sudeep.P.S	525931C	Vellore	9,848,129,302	40	0	2	1	17-Feb-2009	20-Sep-2004
16	39	414	0.00	0.00	0.00	Subramanyam	666952D	Vellore	9,441,524,606	30	0	1	1	10-Apr-2009	12-Jan-2009
17	15	218	0.00	0.00	0.00	Subathra	303762D	Vellore	9,047,881,483	40	0	2	2	08-Oct-2008	17-Sep-2008
18	54	287	0.00	0.00	0.00	Srinivsan	157396D	Vellore	#NULL!	41	1	3	1	31-Dec-2008	17-Nov-2008
19	34	323	0.00	0.00	0.00	Shymala	526912B	Vellore	#NULL!	35	0	2	2	07-Mar-2008	01-Mar-2008
20	5	149	0.00	0.00	0.00	Settu.P	368506D	Arni	#NULL!	38	0	2	1	01-Aug-2000	01-Aug-2008
21	52	398	0.00	0.00	0.00	Sampath	424067D	Polur	4,181,243,321	36	0	2	1	09-Apr-2009	01-Apr-2009
22	42	337	0.00	0.00	0.00	Padmaja	402616D	Chittoor	9,441,080,726	36	0	2	2	11-Feb-2009	03-Feb-2009
23	17	235	0.00	0.00	0.00	Pachiyappan	326525D	Vayaloor	9,600,389,289	49	1	3	1	13-Oct-2008	04-Oct-2008
24	36	330	0.00	0.00	0.00	Nirubarani	381182D	Vellore	9,047,735,620	25	0	1	2	05-Jan-2009	30-Dec-2008
25	44	360	0.00	0.00	0.00	Nagalingam	351115D	Vellore	9,952,853,412	38	0	2	1	05-Jan-2009	05-Jan-2009
26	32	322	0.00	0.00	0.00	Murthy	375470D	Vellore	9,994,049,919	41	1	3	1	24-Dec-2008	17-Dec-2008
27	53	454	0.00	0.00	0.00	Meena	525400C	Vellore	9,952,532,633	36	0	2	2	01-Jun-2009	06-Oct-2004
28	4	12	0.00	0.00	0.00	Kumudhavalli	180923D	polur	9,486,335,461	51	1	4	2	13-Feb-2008	13-Feb-2008
29	22	285	0.00	0.00	0.00	kumari	369446D	Vellore	9,994,790,544	36	0	2	2	17-Dec-2008	03-Dec-2008
30	29	272	0.00	0.00	#NULL!	Kasthuri	350734D	Vellore	9,844,425,647	30	0	1	2	01-Dec-2008	20-Nov-2008
31	25	296	0.00	0.00	#NULL!	Kannamma	342421D	Krishnagiri	9,952,269,202	45	1	3	2	24-Dec-2008	29-Oct-2008
32	24	291	0.00	0.00	#NULL!	Kalaiselvi	370643D	Vellore	#NULL!	40	0	2	2	03-Dec-2008	12-Aug-2008
33	37	332	0.00	0.00	#NULL!	Kala	042930D	Arcot	#NULL!	28	0	1	2	21-Jan-2009	07-Jun-2009
34	43	339	0.00	0.00	#NULL!	Indra Sekar	378417D	chittoor	9,949,163,961	35	0	2	1	04-Feb-2009	27-Dec-2008
35	20	248	0.00	0.00	#NULL!	Hari	669811C	Vellore	9,952,685,353	39	0	2	1	08-Aug-2008	31-Jul-2005
36	6	185	0.00	0.00	#NULL!	Gandhi	304842D	melpootheri, vello	9,976,975,281	27	0	1	1	01-Oct-2008	02-Sep-2008
37	49	368	0.00	0.00	#NULL!	Clarence	383547D	Vellore	9,894,636,680	35	0	2	1	16-Jan-2009	07-Jan-2009
38	45	338	0.00	0.00	#NULL!	Chelam.M.V	321286D	Nellore	#NULL!	36	0	2	1	09-Feb-2008	25-Sep-2008
39	8	189	0.00	0.00	#NULL!	Anitha.A	313020D	Vellore	94,162,295,703	20	0	1	2	18-Sep-2008	18-Sep-2008
40	3	181	0.00	0.00	#NULL!	Anbalagan	179321A	vellore	#NULL!	45	1	3	1	01-Aug-2008	29-Jul-2008
41	46	336	0.00	0.00	#NULL!	Ammu	402824D	Vellore	#NULL!	28	0	1	2	04-Feb-2009	30-Jan-2009

	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	duration	currentstat	CD4	cd4100	CD4date	CD4f1	Cd4datef1	CD4_2	CD4_3	LastCD4	dateofcd4	sexhis	maritalsta	loccpt	income	education
2	0.00	0.00	125	0.00	28-Jan-2009	447	#NULL!	354.00	408.00	408.00	27-Sep-2012	1	1	1	1,000	1.00
3	1.00	0.00	336	0.00	17-Dec-2008	674	#NULL!	649.00	812.00	785.00	27-Jun-2012	1	1	2	5,000	2.00
4	1.00	0.00	196	0.00	01-Mar-2009	271	#NULL!	351.00	419.00	388.00	22-Nov-2012	1	1	0	1,000	2.00
5	0.00	0.00	136	0.00	12-Nov-2008	243	28-May-2009	243.00	328.00	290.00	23-Nov-2012	1	1	1	2,000	2.00
6	0.00	0.00	129	0.00	23-Jul-2008	#NULL!	#NULL!	#NULL!	#NULL!	224.00	#NULL!	1	1	1	1,000	1.00
7	0.00	0.00	24	1.00	27-Nov-2008	81	#NULL!	#NULL!	#NULL!	175.00	11-Oct-2012	1	1	1	500	1.00
8	0.00	0.00	114	0.00	19-Oct-2008	135	05-May-2009	#NULL!	#NULL!	520.00	#NULL!	1	1	2	2,000	2.00
9	0.00	0.00	193	0.00	11-Mar-2009	429	#NULL!	429.00	497.00	497.00	24-Sep-2012	1	1	4	3,000	2.00
10	1.00	0.00	230	0.00	02-Sep-2008	#NULL!	#NULL!	#NULL!	#NULL!	741.00	#NULL!	1	0	4	5,000	1.00
11	0.00	0.00	39	1.00	19-May-2009	100	#NULL!	791.00	834.00	1,004.00	19-Sep-2012	1	1	2	3,000	2.00
12	1.00	2.00	209	0.00	10-Sep-2008	200	#NULL!	200.00	#NULL!	576.00	#NULL!	1	1	1	2,000	1.00
13	0.00	0.00	189	0.00	15-Oct-2008	359	#NULL!	472.00	526.00	554.00	24-Oct-2012	1	1	2	6,000	2.00
14	0.00	0.00	100	0.00	08-Oct-2008	#NULL!	#NULL!	#NULL!	#NULL!	680.00	#NULL!	1	1	1	2,000	1.00
15	1.00	0.00	225	0.00	17-Feb-2009	225	#NULL!	614.00	594.00	530.00	17-Oct-2012	1	1	4	4,000	2.00
16	0.00	0.00	228	0.00	10-Apr-2009	846	#NULL!	631.00	749.00	680.00	20-Dec-2012	1	1	4	1,500	2.00
17	0.00	0.00	86	1.00	08-Oct-2008	#NULL!	#NULL!	#NULL!	#NULL!	1,200.00	#NULL!	1	1	1	500	0.00
18	0.00	0.00	147	0.00	31-Dec-2008	343	#NULL!	356.00	357.00	480.00	27-Jan-2012	1	1	4	10,000	1.00
19	0.00	0.00	268	0.00	07-Mar-2008	359	28-Jan-2009	#NULL!	#NULL!	786.00	#NULL!	1	1	0	500	2.00
20	0.00	0.00	204	0.00	05-Aug-2008	354	28-May-2009	354.00	409.00	591.00	10-Oct-2012	1	1	1	2,000	1.00
21	0.00	0.00	100	0.00	09-Apr-2009	100	#NULL!	157.00	184.00	142.00	13-Aug-2012	1	1	0	1,000	2.00
22	0.00	0.00	233	0.00	11-Feb-2009	232	#NULL!	454.00	303.00	214.00	19-Feb-2012	1	1	1	500	2.00
23	1.00	0.00	174	0.00	13-Oct-2008	419	#NULL!	436.00	479.00	741.00	14-Dec-2012	1	1	3	2,000	2.00
24	0.00	0.00	118	0.00	05-Jan-2009	#NULL!	#NULL!	#NULL!	#NULL!	786.00	#NULL!	1	1	0	500	1.00
25	0.00	0.00	151	0.00	05-Jan-2009	302	#NULL!	281.00	301.00	479.00	23-Sep-2012	1	1	1	1,000	1.00
26	0.00	0.00	25	1.00	24-Dec-2008	327	#NULL!	544.00	590.00	505.00	08-Jan-2013	1	0	4	4,000	2.00
27	1.00	0.00	123	0.00	01-Jun-2009	#NULL!	#NULL!	#NULL!	#NULL!	715.00	#NULL!	1	1	0	500	1.00
28	0.00	0.00	126	0.00	13-Feb-2008	107	#NULL!	370.00	323.00	323.00	29-Aug-2012	1	1	1	1,200	1.00
29	0.00	0.00	239	0.00	17-Dec-2008	515	#NULL!	679.00	545.00	714.00	27-Jun-2012	1	1	1	3,000	0.00
30	0.00	0.00	254	0.00	01-Dec-2008	459	#NULL!	845.00	1,072.00	1,031.00	26-Oct-2012	1	1	0	500	0.00
31	0.00	0.00	174	0.00	24-Dec-2008	602	#NULL!	#NULL!	1,083.00	1,282.00	18-May-2012	1	1	0	500	0.00
32	0.00	0.00	283	0.00	03-Dec-2008	584	#NULL!	1,128.00	1,119.00	1,192.00	23-Aug-2012	1	1	1	500	0.00
33	0.00	0.00	260	0.00	21-Jan-2009	418	#NULL!	713.00	755.00	672.00	25-Sep-2012	1	1	0	500	2.00
34	1.00	0.00	268	0.00	04-Feb-2009	685	#NULL!	667.00	690.00	612.00	22-May-2012	1	1	1	500	1.00
35	0.00	0.00	238	0.00	08-Aug-2008	238	#NULL!	363.00	506.00	665.00	03-Dec-2012	1	1	4	5,000	2.00
36	0.00	0.00	55	1.00	01-Oct-2008	200	22-Jan-2009	344.00	364.00	458.00	16-Aug-2012	1	0	2	2,000	2.00
37	0.00	0.00	64	1.00	16-Jan-2009	218	#NULL!	146.00	150.00	170.00	19-Oct-2012	1	1	2	5,000	2.00
38	0.00	0.00	80	1.00	09-Feb-2008	277	#NULL!	426.00	434.00	376.00	25-Jun-2012	1	1	3	3,000	3.00
39	0.00	0.00	175	0.00	18-Sep-2008	#NULL!	#NULL!	220.00	422.00	448.00	03-Oct-2012	1	0	1	500	2.00
40	0.00	0.00	189	0.00	01-Aug-2008	304	30-Mar-2009	#NULL!	#NULL!	1,072.00	#NULL!	1	1	4	5,000	2.00
41	0.00	0.00	93	1.00	04-Feb-2009	360	#NULL!	650.00	505.00	647.00	18-Sep-2012	1	1	0	500	2.00

	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA	BB	BC	BD	BE
1	WHost	advhiv	Htn	Smok	IHD	PVD	ChDi	Renall	NativeM	Diabet	Dyslipden	Alcoh	Obesit	OP	Vegeta	Toxin	sensy	Tube	TB	DofATT	ATT	PCP	CMV	MISC	Height	weight
2	3	1.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.00	#NULL!	0.00	0	0	0	166	51.0
3	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.00	#NULL!	0.00	0	0	isospora	168	72.0
4	3	1.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.00	#NULL!	0.00	0	0	0	165	57.0
5	3	1.00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	171	47.4
6	1	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1.00	28-Jul-2009	1.00	0	0	0	151	42.0
7	1	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	163	43.0
8	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	167	45.3
9	3	1.00	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	179	67.0
10	2	0.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	162	64.0
11	1	0.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	170	62.4
12	3	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1.00	10-Sep-2008	1.00	0	0	0	167	77.0
13	3	1.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	170	72.0
14	4	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1.00	01-Sep-2008	1.00	0	0	0	164	45.0
15	2	0.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1.00	01-Jan-2006	0.00	0	0	0	169	61.0
16	3	1.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	168	63.0
17	4	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1.00	17-Sep-2008	1.00	1	0	0	162	50.0
18	1	0.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	173	63.0
19	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	160	41.0
20	3	1.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	164	56.0
21	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	169	60.7
22	2	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	168	44.0
23	3	1.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	TPHA	150	55.0
24	1	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	157	59.0
25	2	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	170	70.0
26	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	160	53.0
27	1	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	149	46.8
28	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1.00	02-Mar-2008	1.00	0	0	0	159	44.0
29	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	167	42.8
30	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	156	37.2
31	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	isospora	150	45.0
32	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	Herpes	150	38.0
33	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	163	51.0
34	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	164	52.0
35	3	1.00	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	5	1.00	14-Aug-2009	1.00	0	0	0	163	67.0
36	3	1.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	161	50.0
37	2	0.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	172	55.0
38	2	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1.00	01-Oct-2008	1.00	0	0	0	168	65.0
39	1	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	0	0	160	48.0
40	3	0.00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1.00	06-Aug-2008	1.00	0	0	0	169	64.0
41	3	1.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00	#NULL!	0.00	0	1	0	164	52.0

	BF
1	BMI
2	18.51
3	25.51
4	20.94
5	16.21
6	18.54
7	16.18
8	16.24
9	20.91
10	24.39
11	21.59
12	27.61
13	24.91
14	16.73
15	21.36
16	22.32
17	19.05
18	21.05
19	16.02
20	20.82
21	21.25
22	15.59
23	24.44
24	23.94
25	24.22
26	20.70
27	21.08
28	17.40
29	15.35
30	15.29
31	20.00
32	16.89
33	19.20
34	19.33
35	25.22
36	19.29
37	18.59
38	23.03
39	18.75
40	22.41
41	19.33

	BG	BH	BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU	BV	BW	BX	BY	BZ	CA	CB	CC	CD	CE	CF	CG
1	W1	W2	W3	W4	W5	W6	CVS	RS	ABD	Bardel	B1	MMSE	Olfact	Vision	Eyemov	trig	Facia	vesti	pala	Sten	wasti	Ton	Nflx	next	trunk	Shflx	Shex
2	52.0	52.0	52.00	52.00	52.00	52.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
3	75.3	72.0	74.00	74.00	76.30	77.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
4	58.9	58.0	57.00	59.00	59.00	61.20	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
5	49.7	46.0	46.00	48.00	48.00	48.80	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
6	46.0	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
7	47.0	43.0	50.00	50.00	53.00	53.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
8	45.8	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
9	68.0	67.0	67.00	68.00	68.00	68.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
10	67.0	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
11	62.6	55.0	56.00	56.00	5.00	56.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
12	78.0	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	0	0	0	20	20	30	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
13	72.6	72.0	72.00	72.00	72.00	71.90	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
14	46.4	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
15	62.1	61.0	61.00	63.00	63.00	63.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
16	63.8	63.0	63.00	63.00	63.00	60.70	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
17	51.0	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
18	65.2	63.0	63.00	71.00	71.00	73.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
19	50.0	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
20	60.2	60.0	60.00	60.00	60.00	60.00	0	0	0	20	20	30	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
21	62.0	60.7	60.70	61.00	61.00	61.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
22	47.0	44.0	45.00	45.00	47.00	47.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
23	58.5	59.0	60.00	61.90	66.00	66.00	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
24	60.0	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
25	73.2	72.0	73.00	75.00	75.00	75.00	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
26	54.5	53.0	55.00	54.50	55.00	55.00	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
27	47.0	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
28	45.2	40.0	40.00	44.00	44.00	44.00	0	0	0	20	20	29	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
29	45.9	44.0	44.00	43.50	44.00	44.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
30	39.4	37.0	37.20	40.70	40.00	40.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
31	46.3	48.0	48.00	49.00	49.00	50.20	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
32	41.0	41.0	41.00	41.00	41.00	41.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
33	54.0	52.0	53.00	53.00	54.00	53.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
34	52.2	52.0	52.00	52.00	50.00	50.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
35	70.6	67.0	67.00	67.00	69.00	69.00	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
36	55.8	55.0	55.80	59.00	59.00	59.00	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
37	56.0	55.0	55.00	55.00	62.00	62.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
38	65.5	65.0	64.00	65.00	65.00	65.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
39	48.2	46.0	46.00	46.00	47.90	48.00	0	0	0	20	20	26	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
40	69.7	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	0	0	0	20	20	28	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5
41	52.6	45.0	46.00	46.00	61.00	61.00	0	0	0	20	20	27	0	0	0	0	0	0	0	0	0	0	5	5	0	5	5

	CH	CI	CJ	CK	CL	CM	CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY	CZ	DA	DB	DC	DD	DE	DF	DG	DH	DI
1	Elbfl	Elbe	wrifl	Wrie	Hanc	Hipflx	Hip	Kneefl	Kne	Dor	Plflx	Asy	BiRef	Bire	BraRefR	BraRefL	TrirefR	TrirefL	KneeJR	KneeJL	AnkleJR	AnkleJI	Plantars	Planta	Supab	UlsenFT	UlsenVit	UlsenPt
2	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0
3	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	1	0	0	0	0	0	0
4	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	5	0	0	0	0	0	0
5	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
6	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
7	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
8	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
9	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
10	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
11	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
12	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
13	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
14	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
15	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
16	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
17	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
18	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
19	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
20	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
21	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
22	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
23	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
24	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
25	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
26	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
27	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
28	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
29	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
30	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
31	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
32	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
33	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
34	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
35	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
36	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
37	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
38	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
39	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
40	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
41	5	5	5	5	0	5	5	5	5	5	5	0	2	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0

	DJ
1	Ulsenmon
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0
26	0
27	0
28	0
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0
37	0
38	0
39	0
40	0
41	0

	DK	DL	DM	DN	DO	DP	DQ	DR	DS	DT	DU	DV	DW	DX	DY
1	LLsenFT	LLsenvib	LLsenPT	LLsenMon	Senpattern	cerebellar	Romberg	Gait	Nkstiff	ART	stavd	DoSArt	NewART	ChangeART	DoChaART
2	0	1	1	1	1	0	0	0	0	3	1.00	12-Feb-2009	2	1.00	24-Nov-2011
3	0	1	1	0	1	0	0	0	0	3	1.00	25-Dec-2008	1	1.00	06-Jul-2012
4	0	1	0	1	1	0	0	0	0	1	0.00	02-Apr-2009	#NULL!	0.00	#NULL!
5	0	0	0	0	0	0	0	0	0	3	1.00	20-Nov-2008	#NULL!	0.00	#NULL!
6	0	0	0	0	0	0	0	0	0	4	1.00	15-Oct-2008	3	1.00	20-Jan-2009
7	0	0	0	0	0	0	0	0	0	3	1.00	04-Dec-2008	1	1.00	24-Jun-2012
8	0	0	0	0	0	0	0	0	0	1	0.00	20-Nov-2008	#NULL!	0.00	#NULL!
9	0	0	0	0	0	0	0	0	0	1	0.00	19-Mar-2009	#NULL!	0.00	#NULL!
10	0	0	0	0	0	0	0	0	0	3	1.00	20-Nov-2008	#NULL!	0.00	#NULL!
11	0	0	0	0	0	0	0	0	0	1	0.00	28-May-2009	#NULL!	0.00	#NULL!
12	0	0	0	0	0	0	0	0	0	4	1.00	24-Sep-2008	2	1.00	11-Jun-2008
13	0	0	0	0	0	0	0	0	0	1	0.00	15-Oct-2008	#NULL!	0.00	#NULL!
14	0	0	0	0	0	0	0	0	0	1	0.00	22-Jan-2009	3	1.00	25-Feb-2009
15	0	0	0	0	0	0	0	0	0	1	0.00	07-May-2009	#NULL!	0.00	#NULL!
16	0	0	0	0	0	0	0	0	0	1	0.00	07-May-2009	#NULL!	0.00	#NULL!
17	0	0	0	0	0	0	0	0	0	4	1.00	30-Oct-2008	#NULL!	0.00	#NULL!
18	0	0	0	0	0	0	0	0	0	1	0.00	25-Dec-2008	#NULL!	0.00	#NULL!
19	0	0	0	0	0	0	0	0	0	1	0.00	29-Jan-2009	#NULL!	0.00	#NULL!
20	0	0	0	0	0	0	0	0	0	3	1.00	20-Aug-2008	1	1.00	27-Jun-2012
21	0	0	0	0	0	0	0	0	0	3	1.00	23-Apr-2009	1	1.00	24-Apr-2012
22	0	0	0	0	0	0	0	0	0	3	1.00	12-Feb-2009	1	1.00	02-Mar-2012
23	0	0	0	0	0	0	0	0	0	3	1.00	14-Nov-2008	1	1.00	#NULL!
24	0	0	0	0	0	0	0	0	0	3	1.00	05-Feb-2009	#NULL!	0.00	#NULL!
25	0	0	0	0	0	0	0	0	0	1	0.00	12-Mar-2009	#NULL!	0.00	#NULL!
26	0	0	0	0	0	0	0	0	0	3	1.00	29-Jan-2009	1	1.00	11-Jan-2012
27	0	0	0	0	0	0	0	0	0	1	0.00	11-Jun-2009	2	1.00	26-Jun-2009
28	0	0	0	0	0	0	0	0	0	4	1.00	30-Apr-2008	3	1.00	29-Jan-2009
29	0	0	0	0	0	0	0	0	0	3	1.00	25-Dec-2008	1	1.00	06-Jul-2011
30	0	0	0	0	0	0	0	0	0	3	1.00	10-Dec-2009	4	1.00	21-Jan-2009
31	0	0	0	0	0	0	0	0	0	1	0.00	07-Jan-2009	#NULL!	0.00	#NULL!
32	0	0	0	0	0	0	0	0	0	3	1.00	11-Jan-2009	4	1.00	12-Feb-2009
33	0	0	0	0	0	0	0	0	0	3	1.00	05-Feb-2009	1	1.00	05-Mar-2012
34	0	0	0	0	0	0	0	0	0	3	1.00	12-Feb-2009	#NULL!	0.00	#NULL!
35	0	0	0	0	0	0	0	0	0	2	0.00	20-Nov-2008	1	1.00	20-Mar-2009
36	0	0	0	0	0	0	0	0	0	3	1.00	01-Oct-2008	#NULL!	0.00	#NULL!
37	0	0	0	0	0	0	0	0	0	3	1.00	26-Mar-2009	1	1.00	01-Oct-2011
38	0	0	0	0	0	0	0	0	0	2	0.00	12-Feb-2009	1	1.00	07-Sep-2009
39	0	0	0	0	0	0	0	0	0	3	1.00	01-Oct-2008	4	1.00	05-Nov-2008
40	0	0	0	0	0	0	0	0	0	4	1.00	24-Sep-2008	1	1.00	27-May-2009
41	0	0	0	0	0	0	0	0	0	3	1.00	12-Feb-2009	#NULL!	0.00	#NULL!

	DZ	EA	EB	EC	ED	EE	EF	EG	EH	EI	EJ	EK	EL	EM
1	ResoARTch	NewART2	reasnewart2	datchangARt2	Resson	AdhV1	AdhV2	AdhV3	AdhV4	AdhV5	AdhV6	AdvNeur	AdvSkin	Bonemarw
2	7	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
3	7	#NULL!	#NULL!	#NULL!		100	100	100	#NULL!	100.00	100.00	0	0	0
4	0	#NULL!	#NULL!	#NULL!		100	100	100	#NULL!	100.00	100.00	0	0	0
5	0	#NULL!	#NULL!	#NULL!		100	100	95	95	95.00	100.00	0	0	0
6	5	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
7	7	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
8	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
9	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
10	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
11	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
12	1	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
13	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
14	2	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	1
15	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
16	0	#NULL!	#NULL!	#NULL!		100	100	100	100	#NULL!	100.00	0	0	0
17	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
18	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
19	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
20	7	#NULL!	#NULL!	#NULL!		100	100	100	#NULL!	100.00	100.00	0	0	0
21	7	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
22	7	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
23	7	#NULL!	#NULL!	#NULL!		100	99	100	100	100.00	100.00	0	0	0
24	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
25	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
26	7	#NULL!	#NULL!	#NULL!		100	100	80	80	100.00	100.00	0	0	0
27	3	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	1	0
28	5	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
29	7	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
30	3	2	#NULL!	30-Jan-2012		100	100	100	100	100.00	100.00	0	1	0
31	0	#NULL!	0	#NULL!		100	100	100	100	100.00	100.00	0	0	0
32	3	#NULL!	0	#NULL!		100	100	100	100	100.00	100.00	0	1	0
33	7	6	2	#NULL!		100	100	100	100	100.00	100.00	0	0	0
34	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
35	5	#NULL!	#NULL!	#NULL!		100	100	95	95	95.00	100.00	0	0	0
36	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
37	7	6	2	#NULL!		100	100	100	100	100.00	100.00	0	0	0
38	5	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
39	3	#NULL!	0	#NULL!		100	100	100	100	100.00	100.00	0	1	0
40	5	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0
41	0	#NULL!	#NULL!	#NULL!		100	100	100	100	100.00	100.00	0	0	0

	EN	EO	EP	EQ	ER	ES	ET	EU	EV	EW	EX	EY	EZ	FA
1	GI	Lipodystrophy	TBonART	onATT	Metabolic	MiscAdv	ClinNeur	rmcmp	rmcmprox	lmcmp	lmcmprox	rpcmp	rpcmprox	lpcmp
2	0	1.00	0.00	0.00	0	0	1	20.80	20.00	20.10	16.90	12.90	10.40	12.80
3	0	1.00	0.00	0.00	0	0	1	15.00	13.00	13.00	12.00	13.00	19.00	10.00
4	0	0.00	0.00	0.00	0	0	0	15.30	15.10	18.70	18.10	9.10	7.80	9.40
5	0	1.00	0.00	0.00	0	0	1	11.80	11.50	12.40	9.00	8.20	7.70	8.60
6	0	0.00	#NULL!	#NULL!	0	0	0	18.50	18.00	13.40	12.20	9.90	7.70	6.30
7	0	0.00	#NULL!	#NULL!	0	0	0	10.00	10.00	13.00	11.00	10.00	9.00	9.00
8	0	0.00	#NULL!	#NULL!	0	0	0	13.00	12.00	15.00	13.00	4.00	3.00	5.00
9	0	0.00	#NULL!	#NULL!	0	0	0	19.20	18.00	18.40	16.70	14.10	12.40	10.00
10	0	0.00	0.00	#NULL!	0	0	0	12.60	10.90	14.00	13.80	7.40	6.10	7.80
11	0	0.00	0.00	#NULL!	0	0	0	14.10	13.60	16.70	14.20	11.00	10.20	10.40
12	1	0.00	0.00	#NULL!	1	0	0	19.00	10.50	19.70	10.40	7.40	4.80	6.80
13	0	0.00	0.00	0.00	0	0	0	13.90	12.60	13.90	12.70	10.20	9.00	12.90
14	0	0.00	0.00	#NULL!	0	0	0	15.10	12.40	16.60	14.70	8.40	7.00	8.20
15	0	0.00	0.00	#NULL!	0	0	0	25.40	24.00	25.30	22.30	12.20	10.00	10.90
16	0	0.00	0.00	#NULL!	0	0	0	18.00	18.00	18.00	16.00	12.00	12.00	12.00
17	0	0.00	0.00	#NULL!	0	0	0	10.00	10.00	13.00	13.00	6.00	5.00	2.00
18	0	0.00	0.00	#NULL!	0	0	0	15.00	13.00	10.00	8.00	5.00	5.00	5.00
19	0	0.00	0.00	#NULL!	0	0	0	15.00	14.00	15.00	14.00	20.00	20.00	15.00
20	0	0.00	0.00	#NULL!	0	0	0	19.50	19.00	19.20	18.20	7.30	6.60	5.00
21	0	0.00	0.00	#NULL!	0	0	0	15.00	15.00	18.00	15.00	13.00	13.00	10.00
22	0	0.00	#NULL!	#NULL!	0	0	0	20.80	20.50	28.10	23.30	10.10	9.70	14.10
23	0	1.00	0.00	0.00	0	0	0	14.50	14.10	12.70	12.10	5.40	4.30	6.30
24	0	0.00	#NULL!	#NULL!	0	0	0	22.00	22.00	20.00	20.00	7.00	7.00	8.00
25	0	0.00	#NULL!	#NULL!	0	0	0	13.00	12.00	20.00	18.00	6.00	6.00	7.00
26	0	1.00	0.00	0.00	0	0	0	10.00	10.00	13.00	12.00	20.00	17.00	20.00
27	0	0.00	#NULL!	#NULL!	0	0	0	25.00	20.00	18.00	15.00	12.00	10.00	10.00
28	0	0.00	0.00	0.00	0	0	0	17.00	15.00	15.00	15.00	3.50	3.00	4.00
29	0	0.00	#NULL!	#NULL!	0	0	0	23.00	20.00	25.00	20.00	6.00	6.00	6.00
30	0	1.00	0.00	0.00	0	0	0	13.00	12.00	12.00	10.00	8.00	8.00	8.00
31	0	0.00	#NULL!	#NULL!	0	0	0	11.70	10.70	17.00	15.60	7.80	5.90	7.20
32	0	0.00	#NULL!	#NULL!	0	0	0	18.00	15.40	22.60	22.20	11.20	10.30	12.30
33	0	0.00	#NULL!	#NULL!	0	0	0	18.00	15.00	21.00	20.00	12.00	8.00	12.00
34	0	1.00	0.00	0.00	0	0	0	20.00	28.00	18.00	16.00	10.00	8.00	10.00
35	0	0.00	#NULL!	#NULL!	0	0	0	13.00	12.20	15.70	15.80	12.90	12.80	12.10
36	0	1.00	0.00	0.00	0	0	0	14.30	14.10	14.00	13.90	9.80	8.50	13.10
37	0	1.00	0.00	0.00	0	hbsag	0	12.60	8.70	11.10	10.10	13.70	13.10	7.00
38	0	0.00	#NULL!	#NULL!	0	0	0	12.40	10.50	14.30	13.30	7.10	5.20	9.00
39	0	1.00	0.00	0.00	0	0	0	11.30	10.40	12.40	9.70	13.30	11.70	10.20
40	0	0.00	#NULL!	#NULL!	0	0	0	12.00	10.00	10.00	10.00	15.00	12.00	12.00
41	0	0.00	#NULL!	#NULL!	0	0	0	15.00	15.00	18.00	15.00	10.00	8.00	10.00

	FB	FC	FD	FE	FF	FG	FH	FI	FJ	FK	FL	FM	FN	FO
1	lpcmprox	rmdl	lmdl	rpdl	lpdl	rmf	lmf	rpf	lpf	rmcv	lmcv	rpcv	lpcv	rmsnp
2	12.10	3.40	3.10	3.00	3.50	26.10	26.70	45.80	43.40	64.00	63.00	48.00	51.00	21.00
3	10.00	3.16	3.46	3.72	2.04	26.60	27.80	52.00	51.20	5.80	54.00	46.50	46.20	40.00
4	8.20	2.80	2.30	3.10	3.40	24.80	26.70	44.40	45.70	58.00	52.00	59.00	50.00	28.00
5	6.80	2.80	2.80	3.50	3.90	26.00	23.70	42.80	47.90	53.00	58.00	48.00	44.00	29.00
6	4.40	2.80	2.70	2.40	2.20	24.50	23.20	44.40	42.70	58.00	59.00	53.00	51.00	19.00
7	8.00	3.44	2.96	3.56	3.78	24.60	25.40	46.20	43.20	56.80	54.80	41.90	42.80	30.00
8	4.00	3.96	2.92	2.96	2.96	25.80	25.40	43.10	48.00	77.90	61.40	47.00	53.00	20.00
9	7.80	3.20	3.20	3.20	3.60	29.00	30.50	49.80	48.60	60.00	62.00	49.00	54.00	24.00
10	7.00	5.20	4.10	3.50	3.50	32.50	28.00	44.80	46.80	54.00	53.00	47.00	47.00	33.00
11	9.70	3.40	3.00	3.30	3.30	28.30	27.20	46.10	49.90	61.00	51.00	53.00	50.00	40.00
12	5.10	3.00	2.20	2.70	3.00	26.10	26.10	45.60	49.00	52.00	42.30	42.00	50.00	29.00
13	11.20	3.50	2.80	3.30	3.20	27.30	27.20	44.20	45.00	63.00	54.00	51.00	56.00	38.00
14	6.20	3.70	3.20	3.90	4.20	28.30	28.20	49.80	54.70	52.00	42.00	40.00	38.00	25.00
15	8.60	2.50	2.30	3.00	2.80	24.90	23.90	57.80	46.10	56.00	57.00	49.00	49.00	30.00
16	10.00	3.04	3.32	3.28	3.44	23.60	24.40	36.60	37.00	59.60	60.60	55.10	58.20	40.00
17	2.00	3.30	3.00	3.64	3.84	25.20	23.80	49.00	47.40	65.70	65.50	52.40	51.30	20.00
18	4.00	3.36	3.40	3.32	3.08	26.80	26.40	48.20	48.00	53.00	51.20	49.50	42.70	40.00
19	14.00	3.26	3.52	3.72	3.12	26.20	23.80	40.80	41.20	65.20	70.60	62.10	66.80	40.00
20	4.20	3.40	3.00	2.90	2.80	28.90	29.80	45.50	47.70	53.00	59.00	45.00	43.00	38.00
21	8.00	3.40	2.72	3.16	2.80	24.20	25.20	45.60	45.00	65.10	59.00	58.40	52.40	40.00
22	11.80	2.90	2.60	2.70	2.60	26.20	24.70	36.00	35.20	66.00	69.00	60.00	53.00	40.00
23	5.10	3.10	2.90	3.90	3.30	26.40	26.60	49.10	50.60	59.00	60.00	47.00	42.00	27.00
24	7.00	2.52	2.60	2.96	3.48	25.80	20.80	37.80	40.40	61.10	61.80	53.50	52.90	40.00
25	7.00	3.04	2.72	3.08	3.68	26.40	25.60	50.80	49.00	63.10	52.30	46.90	50.10	20.00
26	18.00	3.26	3.16	3.72	3.24	26.20	26.40	41.80	41.20	67.60	55.00	48.40	44.50	40.00
27	8.00	3.06	2.86	3.12	3.32	25.60	26.00	45.60	42.80	48.70	50.00	49.70	55.70	25.00
28	4.00	3.20	3.16	3.44	3.72	27.20	24.60	52.00	50.80	49.10	54.20	46.10	54.20	30.00
29	6.00	3.00	3.08	3.92	3.90	24.80	23.60	42.60	46.00	55.60	59.40	57.50	54.60	60.00
30	6.00	3.24	3.52	3.28	3.80	22.60	22.20	46.60	40.80	69.20	67.40	56.50	62.90	25.00
31	6.30	2.90	3.00	3.20	3.10	22.40	25.80	43.60	42.40	56.00	57.00	46.00	49.00	54.00
32	10.90	3.40	3.00	2.60	3.50	21.50	22.90	43.30	40.60	59.00	58.00	49.00	55.00	41.00
33	10.00	3.32	3.28	3.96	4.04	26.60	28.60	45.20	49.40	54.30	54.10	48.30	42.70	30.00
34	10.00	3.48	3.68	3.88	4.12	26.80	27.20	43.80	45.00	53.90	63.80	49.30	46.00	40.00
35	12.00	3.10	3.30	3.60	3.70	28.10	28.20	54.10	49.70	64.00	60.00	53.00	51.00	57.00
36	11.30	3.00	3.20	3.30	3.40	25.30	25.70	45.80	44.50	61.00	68.00	49.00	50.00	32.00
37	6.90	5.80	5.20	3.20	3.80	26.00	27.20	46.20	47.80	59.00	57.00	48.00	51.00	23.00
38	7.60	3.20	3.00	3.40	3.40	28.00	26.90	47.30	47.20	58.00	60.00	40.00	40.00	34.00
39	9.00	2.90	2.70	2.90	2.90	22.60	21.70	41.00	42.80	67.00	74.00	54.00	55.00	46.00
40	10.00	3.72	2.88	3.60	3.32	26.20	25.20	47.40	49.80	51.70	51.00	49.30	56.60	20.00
41	8.00	3.36	3.08	3.76	3.40	24.80	24.00	46.20	46.20	55.30	65.60	45.90	48.00	40.00

	FP
1	lmsnp
2	29.00
3	30.00
4	30.00
5	45.00
6	23.00
7	30.00
8	25.00
9	22.00
10	37.00
11	40.00
12	24.00
13	36.00
14	16.00
15	42.00
16	40.00
17	20.00
18	40.00
19	40.00
20	29.00
21	40.00
22	44.00
23	26.00
24	40.00
25	20.00
26	35.00
27	25.00
28	30.00
29	50.00
30	30.00
31	46.00
32	67.00
33	25.00
34	40.00
35	47.00
36	30.00
37	25.00
38	34.00
39	42.00
40	20.00
41	40.00

	FQ	FR	FS	FT	FU	FV	FW	FX	FY	FZ	GA	GB	GC	GD
1	rsnp	lssnp	rucmp	rucmprox	lucmp	lucmprox	rudl	ludl	ruf	luf	rucv	lucv	rusnp	lusnp
2	43.00	35.00	15.50	14.60	13.80	13.20	2.90	3.00	25.40	26.60	63.00	69.00	23.00	21.00
3	30.00	20.00	13.00	13.00	12.00	12.00	2.64	2.68	23.80	28.60	53.10	53.70	20.00	20.00
4	21.00	21.00	20.50	19.60	17.60	16.50	2.20	1.80	27.70	25.10	64.00	59.00	34.00	33.00
5	20.00	20.00	14.30	13.80	10.00	9.70	2.40	2.70	25.60	28.20	57.00	52.00	23.00	26.00
6	32.00	36.00	15.10	14.50	11.50	11.00	2.20	2.30	26.90	25.60	57.00	64.00	40.00	24.00
7	40.00	40.00	8.00	8.00	9.00	8.00	2.88	2.60	22.80	25.40	57.10	62.50	20.00	20.00
8	20.00	20.00	14.00	13.00	12.00	11.00	2.80	3.04	25.80	24.60	61.50	64.50	20.00	30.00
9	23.00	28.00	15.40	13.90	14.30	13.40	2.70	3.00	29.20	30.30	66.00	75.00	48.00	24.00
10	24.00	30.00	17.90	15.80	18.50	17.50	3.50	3.20	28.20	29.00	54.00	56.00	26.00	21.00
11	25.00	26.00	17.20	15.20	17.30	16.00	2.40	2.40	29.00	29.20	59.00	65.00	34.00	31.00
12	21.00	30.00	15.40	11.30	15.20	12.90	2.20	2.10	25.30	24.50	59.00	56.00	23.00	29.00
13	24.00	20.00	18.40	17.60	17.70	16.90	2.80	2.20	28.70	26.50	55.00	65.00	25.00	30.00
14	21.00	19.00	14.80	14.70	14.80	11.80	2.50	2.30	27.10	27.60	56.00	60.00	14.00	17.00
15	17.00	17.00	18.20	16.60	15.40	14.10	1.90	1.70	26.60	26.80	63.00	55.00	22.00	22.00
16	25.00	25.00	15.00	15.00	15.00	15.00	1.88	2.08	23.60	22.60	63.00	67.60	30.00	25.00
17	25.00	25.00	13.00	13.00	13.00	12.00	2.64	2.72	24.80	23.60	65.50	67.60	30.00	40.00
18	20.00	20.00	14.00	12.00	10.00	8.00	2.56	2.92	26.20	26.40	51.20	54.80	20.00	20.00
19	50.00	50.00	20.00	20.00	20.00	20.00	1.56	1.72	25.40	23.80	58.50	68.00	30.00	40.00
20	65.00	50.00	17.20	17.00	15.20	12.10	2.60	2.70	25.00	29.30	59.00	57.00	29.00	29.00
21	20.00	20.00	17.00	16.00	17.00	15.00	2.68	2.72	23.80	24.20	64.70	5.30	20.00	20.00
22	22.00	29.00	18.50	17.20	18.20	17.10	2.40	2.50	22.80	23.80	68.00	74.00	31.00	22.00
23	19.00	22.00	14.10	12.50	14.10	12.50	2.10	2.20	28.30	31.40	56.00	54.00	20.00	22.00
24	50.00	50.00	12.00	12.00	11.00	10.00	1.68	1.76	24.80	23.20	63.60	66.70	25.00	20.00
25	40.00	40.00	14.00	14.00	15.00	15.00	3.04	3.00	25.40	27.60	69.00	68.00	25.00	25.00
26	50.00	50.00	15.00	15.00	15.00	15.00	2.88	2.52	26.20	24.60	51.50	56.40	20.00	20.00
27	30.00	20.00	12.00	10.00	12.00	10.00	2.12	2.27	23.40	24.00	57.70	63.00	25.00	30.00
28	25.00	25.00	19.00	18.00	17.00	15.00	2.76	2.28	27.00	26.00	57.40	57.70	25.00	25.00
29	40.00	20.00	20.00	20.00	16.00	15.00	2.96	2.80	24.20	24.00	78.40	63.00	40.00	40.00
30	20.00	25.00	15.00	15.00	13.00	12.00	2.72	2.76	23.40	22.60	64.10	70.50	20.00	25.00
31	23.00	41.00	13.70	12.90	16.80	15.50	1.90	2.20	25.90	24.60	69.00	69.00	44.00	49.00
32	62.00	59.00	15.50	14.80	16.30	15.80	2.50	2.40	21.20	23.50	58.00	57.00	36.00	24.00
33	40.00	40.00	15.00	15.00	13.00	12.00	2.44	2.04	27.80	25.20	58.50	55.20	20.00	30.00
34	25.00	30.00	18.00	16.00	15.00	13.00	2.16	2.96	26.20	25.60	57.80	56.20	25.00	25.00
35	49.00	46.00	17.80	17.40	18.90	17.80	2.40	2.40	30.20	26.50	57.00	58.00	19.00	20.00
36	34.00	24.00	12.90	11.90	14.70	14.20	2.40	2.60	26.60	26.40	65.00	65.00	26.00	34.00
37	23.00	21.00	13.70	13.10	16.70	15.70	2.20	2.70	26.60	28.00	60.00	63.00	38.00	23.00
38	25.00	21.00	8.10	6.70	8.40	7.90	2.10	2.60	28.20	27.00	58.00	65.00	26.00	23.00
39	94.00	62.00	15.60	14.70	18.60	16.30	2.20	2.10	22.10	22.60	67.00	67.00	40.00	33.00
40	30.00	25.00	12.00	12.00	10.00	10.00	2.68	2.92	26.20	26.00	50.40	57.10	20.00	20.00
41	40.00	50.00	15.00	15.00	12.00	10.00	1.92	2.36	26.20	24.00	50.40	63.00	40.00	30.00

	GE
1	hinneurEP
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
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28	0
29	0
30	0
31	0
32	0
33	0
34	0
35	0
36	0
37	0
38	0
39	0
40	0
41	0

	GF	GG	GH	GI	GJ	GK	GL	GM	GN	GO	GP	GQ	GR	GS
1	CD4d	bmi20	rmcmpF6	rmcppF6	lmcpF6	lmcppF6	rpcpF6	rpcppF6	lpcpF6	lpcppF6	rmdlF6	lmdlF6	rpdlF6	lpdlF6
2	3.00	1.00	11.50	11.10	12.20	11.60	12.20	10.60	12.00	10.10	4.10	4.10	3.40	3.60
3	4.00	0.00	16.60	15.20	14.70	14.20	9.20	7.20	7.30	6.10	3.00	3.10	3.60	3.60
4	3.00	0.00	17.80	15.20	18.40	18.60	13.90	12.00	12.00	11.10	3.10	3.00	3.60	3.80
5	3.00	1.00	18.20	17.40	16.90	16.00	8.30	7.40	6.10	5.50	2.80	3.00	3.40	3.40
6	3.00	1.00	10.50	9.40	11.10	9.20	8.30	6.80	5.10	4.40	4.80	5.00	4.20	4.30
7	1.00	1.00	11.30	10.20	13.00	11.00	7.80	6.50	11.30	9.70	2.70	2.50	2.60	3.00
8	3.00	1.00	11.40	11.20	14.80	13.40	2.60	1.80	5.40	4.50	2.90	2.50	2.90	2.80
9	3.00	0.00	14.40	13.20	16.90	13.60	12.20	11.30	10.50	9.30	3.80	3.50	3.40	3.80
10	4.00	0.00	14.20	11.80	9.50	9.30	7.50	6.50	10.70	8.60	3.20	3.10	3.90	4.00
11	1.00	0.00	19.90	18.80	18.30	18.80	12.90	11.00	13.30	11.30	3.10	3.10	3.30	3.20
12	4.00	0.00	11.10	10.40	11.80	11.50	10.20	7.10	7.70	6.10	3.20	2.80	2.90	2.80
13	3.00	0.00	14.20	11.80	9.50	9.30	7.50	6.50	10.70	8.60	3.20	3.10	3.90	4.00
14	2.00	1.00	13.20	11.10	16.60	13.40	17.10	12.40	9.80	7.70	2.90	3.00	3.00	3.30
15	4.00	0.00	22.90	20.80	20.50	20.50	4.80	3.70	13.70	10.30	2.80	2.60	2.70	3.00
16	4.00	0.00	17.80	16.20	26.50	21.10	12.50	11.40	8.30	6.50	3.20	2.50	3.40	3.90
17	2.00	1.00	13.20	11.10	16.60	13.40	17.10	12.40	9.80	7.70	2.90	3.00	3.00	3.30
18	3.00	0.00	17.00	16.10	14.60	12.90	7.30	6.40	7.10	6.30	3.10	3.10	3.20	3.40
19	4.00	1.00	16.60	13.80	14.80	11.80	10.00	9.40	10.40	9.00	3.30	2.80	2.90	2.90
20	4.00	0.00	13.20	11.10	16.60	13.40	17.10	12.40	9.80	7.70	2.90	3.00	3.00	3.30
21	2.00	0.00	13.40	10.00	22.10	21.00	9.00	8.50	7.20	6.70	2.80	2.50	2.80	2.40
22	4.00	1.00	26.30	24.80	21.00	20.50	9.20	8.50	11.90	11.10	3.20	3.10	3.00	3.10
23	3.00	0.00	14.60	14.20	14.00	12.50	9.30	7.70	7.30	4.70	3.40	2.90	3.80	3.80
24	3.00	0.00	23.90	23.40	23.80	23.40	11.30	9.30	10.70	8.80	2.30	2.50	2.90	2.90
25	3.00	0.00	13.00	12.10	15.00	14.50	8.40	6.20	7.30	6.00	2.80	2.60	2.50	3.10
26	1.00	0.00	11.60	10.60	16.20	15.50	18.40	16.30	21.60	18.20	2.70	2.50	2.90	2.90
27	3.00	0.00	14.20	11.80	9.50	9.30	7.50	6.50	10.70	8.60	3.20	3.10	3.90	4.00
28	3.00	1.00	13.20	12.30	17.30	16.40	6.30	4.00	3.80	2.30	2.70	2.60	2.90	3.10
29	4.00	1.00	19.10	18.80	15.30	14.40	6.70	6.50	5.10	4.20	3.10	2.90	3.80	3.70
30	4.00	1.00	7.80	7.70	11.40	11.00	8.40	7.10	9.00	7.50	2.90	2.90	3.60	3.30
31	3.00	0.00	16.80	15.60	18.10	17.50	10.00	7.90	9.80	8.30	2.90	3.50	3.90	3.40
32	4.00	1.00	11.10	10.40	11.80	11.50	10.20	7.10	7.70	6.10	3.20	2.80	2.90	2.80
33	4.00	1.00	16.50	15.90	22.90	20.20	13.50	10.80	10.10	8.90	3.00	3.20	3.70	3.90
34	4.00	1.00	10.50	9.40	11.10	9.20	8.30	6.80	5.10	4.40	4.80	5.00	4.20	4.30
35	4.00	0.00	10.50	9.40	11.10	9.20	8.30	6.80	5.10	4.40	4.80	5.00	4.20	4.30
36	2.00	1.00	16.30	16.10	19.10	18.30	13.60	12.60	13.10	13.00	3.30	3.30	3.80	3.90
37	2.00	1.00	13.70	13.00	13.80	14.50	7.40	7.50	7.20	6.70	3.10	3.20	4.00	4.30
38	2.00	0.00	12.20	11.70	15.00	14.70	7.60	5.70	10.40	8.40	3.20	3.00	3.20	3.60
39	3.00	1.00	12.10	11.20	12.80	12.40	12.20	10.60	10.10	8.80	2.70	2.80	2.60	2.80
40	3.00	0.00	11.10	10.40	11.80	11.50	10.20	7.10	7.70	6.10	3.20	2.80	2.90	2.80
41	2.00	1.00	20.70	20.20	24.50	23.60	9.10	7.40	9.10	7.30	2.60	2.50	3.60	2.80

	GT
1	rmfF6
2	27.40
3	28.30
4	24.50
5	25.70
6	28.50
7	25.00
8	26.30
9	29.30
10	28.10
11	27.30
12	23.50
13	28.10
14	25.40
15	26.10
16	24.30
17	25.40
18	27.90
19	23.50
20	25.40
21	25.50
22	24.70
23	28.40
24	21.80
25	27.90
26	26.10
27	28.10
28	26.90
29	24.50
30	23.30
31	25.00
32	23.50
33	26.10
34	28.50
35	28.50
36	24.50
37	27.40
38	26.50
39	22.80
40	23.50
41	26.20

	GU	GV	GW	GX	GY	GZ	HA	HB	HC	HD	HE	HF	HG	HH
1	lmfF6	rpfF6	lpfF6	rmcvF6	lmcvF6	rpcvF6	lpcvF6	rmsnpF6	lmsnpF6	rssnpF6	lssnpF6	rucpF6	rucppF6	lucpF6
2	26.80	42.80	44.90	64.00	58.00	50.00	51.00	48.00	29.00	20.00	18.00	17.10	16.00	15.40
3	28.80	52.50	52.30	50.00	50.00	42.00	42.00	22.00	22.00	6.00	9.00	13.50	11.60	11.80
4	26.20	47.70	45.90	57.00	53.00	51.00	49.00	25.00	20.00	23.00	20.00	23.50	21.80	23.60
5	25.40	47.90	49.90	61.00	67.00	45.00	47.00	35.00	36.00	12.00	0.00	20.20	18.90	14.90
6	28.10	56.10	54.10	58.00	55.00	38.00	39.00	23.00	28.00	11.00	3.00	14.40	11.40	11.90
7	24.50	46.50	43.80	57.00	60.00	46.00	54.00	25.00	27.00	28.00	25.00	13.10	10.00	10.80
8	25.00	48.70	47.50	57.00	55.00	50.00	54.00	35.00	36.00	0.00	12.00	13.30	12.00	14.20
9	29.50	49.50	49.10	57.00	55.00	46.00	47.00	25.00	31.00	16.00	4.00	14.90	13.00	13.00
10	24.50	45.60	48.10	61.00	68.00	43.00	52.00	36.00	77.00	23.00	31.00	#NULL!	#NULL!	#NULL!
11	32.60	46.60	47.60	58.00	58.00	52.00	52.00	24.00	25.00	20.00	25.00	19.20	15.20	21.30
12	22.30	43.00	44.10	61.00	61.00	51.00	49.00	50.00	52.00	23.00	27.00	19.20	17.20	22.20
13	24.50	45.60	48.10	61.00	68.00	43.00	52.00	36.00	77.00	23.00	31.00	16.80	13.10	14.70
14	25.20	42.30	41.00	60.00	76.00	54.00	54.00	24.00	21.00	17.00	17.00	19.80	16.80	16.10
15	24.90	44.80	48.50	58.00	63.00	52.00	52.00	34.00	56.00	16.00	23.00	16.00	14.20	13.80
16	24.20	42.30	44.90	66.00	58.00	53.00	57.00	22.00	50.00	21.00	20.00	21.30	20.20	18.90
17	25.20	42.30	41.00	60.00	76.00	54.00	54.00	24.00	21.00	17.00	17.00	#NULL!	#NULL!	#NULL!
18	27.30	50.50	50.30	55.00	55.00	44.00	45.00	45.00	41.00	22.00	21.00	15.30	15.20	14.70
19	22.90	41.20	46.40	62.00	61.00	55.00	56.00	102.00	100.00	43.00	37.00	19.40	18.40	19.50
20	25.20	42.30	41.00	60.00	76.00	54.00	54.00	24.00	21.00	17.00	17.00	19.80	16.80	16.10
21	28.00	46.20	43.20	58.00	69.00	53.00	53.00	21.00	25.00	21.00	23.00	15.90	15.50	12.40
22	23.00	37.40	39.60	60.00	71.00	54.00	61.00	31.00	21.00	44.00	24.00	24.60	22.10	20.00
23	28.00	51.50	50.40	60.00	59.00	48.00	51.00	21.00	23.00	15.00	21.00	21.20	19.20	14.40
24	22.50	38.40	43.70	62.00	66.00	56.00	54.00	54.00	47.00	31.00	21.00	19.00	18.70	15.60
25	25.90	48.70	48.40	58.00	53.00	49.00	50.00	35.00	29.00	49.00	52.00	13.50	12.70	14.60
26	24.50	43.70	46.10	59.00	62.00	52.00	54.00	25.00	20.00	20.00	28.00	15.20	14.20	17.70
27	24.50	45.60	48.10	61.00	68.00	43.00	52.00	36.00	77.00	23.00	31.00	16.80	13.10	14.70
28	28.00	45.30	48.80	57.00	51.00	44.00	43.00	31.00	29.00	29.00	27.00	16.30	13.60	15.00
29	28.30	46.70	43.90	63.00	69.00	51.00	50.00	72.00	44.00	33.00	33.00	17.70	14.80	17.50
30	22.60	40.10	42.80	58.00	66.00	55.00	56.00	45.00	49.00	28.00	22.00	13.80	12.40	11.00
31	26.80	47.10	44.20	55.00	57.00	52.00	57.00	29.00	31.00	30.00	22.00	17.10	15.20	20.20
32	22.30	43.00	44.10	61.00	61.00	51.00	49.00	50.00	52.00	23.00	27.00	#NULL!	#NULL!	#NULL!
33	25.70	50.40	54.00	58.00	60.00	51.00	52.00	46.00	36.00	36.00	26.00	16.20	14.10	17.10
34	28.10	56.10	54.10	58.00	55.00	38.00	39.00	23.00	28.00	11.00	3.00	#NULL!	#NULL!	#NULL!
35	28.10	56.10	54.10	58.00	55.00	38.00	39.00	23.00	28.00	11.00	3.00	14.40	11.40	11.90
36	25.40	45.10	43.40	61.00	65.00	53.00	58.00	62.00	46.00	37.00	37.00	16.10	16.00	17.10
37	27.60	48.00	49.20	68.00	62.00	54.00	55.00	31.00	29.00	29.00	26.00	18.80	17.90	13.80
38	26.30	48.10	45.50	57.00	60.00	51.00	52.00	32.00	24.00	27.00	20.00	8.50	7.40	9.20
39	22.60	39.60	40.10	69.00	69.00	56.00	55.00	39.00	47.00	38.00	63.00	14.60	14.20	14.60
40	22.30	43.00	44.10	61.00	61.00	51.00	49.00	50.00	52.00	23.00	27.00	19.20	17.20	22.20
41	23.00	43.50	44.10	57.00	66.00	51.00	51.00	83.00	43.00	21.00	22.00	20.20	18.60	17.60

	HI
1	lucppF6
2	12.00
3	9.70
4	22.20
5	11.00
6	10.70
7	10.80
8	12.90
9	12.40
10	#NULL!
11	19.20
12	21.70
13	14.20
14	15.20
15	11.70
16	18.90
17	#NULL!
18	12.50
19	18.90
20	15.20
21	10.90
22	18.90
23	12.90
24	12.70
25	13.20
26	15.40
27	14.20
28	12.90
29	13.20
30	10.90
31	17.70
32	#NULL!
33	14.10
34	#NULL!
35	10.70
36	15.80
37	13.00
38	8.60
39	13.10
40	21.70
41	16.10

	HJ	HK	HL	HM	HN	HO	HP	HQ	HR	HS	HT	HU	HV	HW
1	rudlF6	ludlF6	rufF6	lufF6	rucvF6	lucvF6	rusnpF6	lusnpF6	duroart1	VAR00012	DuraART	duradiseae	crntdate	duradiseaeinwks
2	2.80	2.50	28.50	28.00	64.00	60.00	26.00	20.00	1,015.00	1,015.00	3.00	-1,492.00	15-Mar-2013	-213.14
3	2.50	8.40	30.70	30.40	46.00	54.00	5.00	9.00	1,289.00	1,289.00	3.00	-1,541.00	15-Mar-2013	-220.14
4	2.50	2.50	26.70	26.60	60.00	75.00	44.00	33.00	#NULL!	1,443.00	3.00	-1,443.00	15-Mar-2013	-206.14
5	2.10	2.10	27.20	26.50	58.00	62.00	20.00	22.00	#NULL!	1,576.00	3.00	-1,576.00	15-Mar-2013	-225.14
6	2.90	3.40	29.10	30.70	48.00	51.00	19.00	#NULL!	97.00	97.00	1.00	-1,612.00	15-Mar-2013	-230.29
7	1.90	2.20	27.80	25.10	63.00	72.00	31.00	30.00	1,298.00	1,298.00	3.00	-1,562.00	15-Mar-2013	-223.14
8	2.80	2.50	27.40	27.20	60.00	70.00	67.00	61.00	#NULL!	1,576.00	3.00	-1,576.00	15-Mar-2013	-225.14
9	3.40	3.20	29.10	29.30	57.00	62.00	25.00	20.00	#NULL!	1,457.00	3.00	-1,457.00	15-Mar-2013	-208.14
10	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	1,576.00	3.00	-1,576.00	15-Mar-2013	-225.14
11	2.40	2.30	27.30	28.50	59.00	59.00	24.00	26.00	#NULL!	1,387.00	3.00	-1,387.00	15-Mar-2013	-198.14
12	2.00	1.70	22.90	23.90	66.00	63.00	33.00	#NULL!	105.00	105.00	1.00	-1,633.00	15-Mar-2013	-233.29
13	2.40	2.60	24.20	25.10	67.00	70.00	23.00	16.80	#NULL!	1,612.00	3.00	-1,612.00	15-Mar-2013	-230.29
14	2.50	2.80	26.00	26.10	67.00	77.00	20.00	#NULL!	34.00	34.00	1.00	-1,513.00	15-Mar-2013	-216.14
15	2.60	2.10	26.30	26.80	68.00	64.00	38.00	28.00	#NULL!	1,408.00	3.00	-1,408.00	15-Mar-2013	-201.14
16	2.20	2.10	24.30	23.70	74.00	71.00	23.00	27.00	#NULL!	1,408.00	3.00	-1,408.00	15-Mar-2013	-201.14
17	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	1,597.00	3.00	-1,597.00	15-Mar-2013	-228.14
18	2.60	2.50	27.60	24.90	66.00	57.00	27.00	20.00	#NULL!	1,541.00	3.00	-1,541.00	15-Mar-2013	-220.14
19	2.40	1.80	30.80	24.00	61.00	63.00	35.00	42.00	#NULL!	1,506.00	3.00	-1,506.00	15-Mar-2013	-215.14
20	2.50	2.80	26.00	26.10	67.00	77.00	20.00	19.80	1,407.00	1,407.00	3.00	-1,668.00	15-Mar-2013	-238.29
21	2.20	2.30	24.60	23.20	70.00	67.00	22.00	27.00	1,097.00	1,097.00	3.00	-1,422.00	15-Mar-2013	-203.14
22	2.00	2.30	22.50	23.90	61.00	61.00	22.00	24.00	1,114.00	1,114.00	3.00	-1,492.00	15-Mar-2013	-213.14
23	2.40	2.60	26.50	26.60	69.00	57.00	18.00	15.00	37,124.00	37,124.00	3.00	-1,582.00	15-Mar-2013	-226.00
24	1.60	2.10	21.90	22.60	68.00	71.00	26.00	34.00	#NULL!	1,499.00	3.00	-1,499.00	15-Mar-2013	-214.14
25	2.50	2.40	28.30	27.50	59.00	64.00	26.00	25.00	#NULL!	1,464.00	3.00	-1,464.00	15-Mar-2013	-209.14
26	2.10	2.20	25.20	25.20	61.00	63.00	22.00	21.00	1,077.00	1,077.00	3.00	-1,506.00	15-Mar-2013	-215.14
27	2.40	2.60	24.20	25.10	67.00	70.00	23.00	#NULL!	15.00	15.00	1.00	-1,373.00	15-Mar-2013	-196.14
28	2.50	2.40	28.50	26.30	58.00	65.00	24.00	24.00	274.00	274.00	2.00	-1,780.00	15-Mar-2013	-254.29
29	2.30	2.30	27.30	24.70	66.00	65.00	33.00	27.00	923.00	923.00	3.00	-1,541.00	15-Mar-2013	-220.14
30	2.60	2.30	24.20	23.60	70.00	62.00	39.00	34.00	323.00	323.00	2.00	-1,191.00	15-Mar-2013	-170.14
31	2.30	2.50	24.60	25.10	64.00	73.00	21.00	29.00	#NULL!	1,528.00	3.00	-1,528.00	15-Mar-2013	-218.29
32	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	32.00	32.00	1.00	-1,524.00	15-Mar-2013	-217.71
33	2.50	2.50	27.90	25.30	68.00	66.00	23.00	25.00	1,124.00	1,124.00	3.00	-1,499.00	15-Mar-2013	-214.14
34	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	#NULL!	1,492.00	3.00	-1,492.00	15-Mar-2013	-213.14
35	2.90	3.40	29.10	30.70	48.00	51.00	19.00	14.40	120.00	120.00	1.00	-1,576.00	15-Mar-2013	-225.14
36	2.60	2.90	26.40	25.20	69.00	65.00	24.00	18.00	#NULL!	1,625.00	3.00	-1,626.00	15-Mar-2013	-232.29
37	3.20	2.70	28.10	25.30	63.00	56.00	24.00	22.00	919.00	919.00	3.00	-1,450.00	15-Mar-2013	-207.14
38	2.40	2.30	26.50	29.50	67.00	65.00	35.00	19.00	207.00	207.00	2.00	-1,492.00	15-Mar-2013	-213.14
39	1.90	2.00	23.20	23.30	69.00	59.00	35.00	51.00	35.00	35.00	1.00	-1,626.00	15-Mar-2013	-232.29
40	2.00	1.70	22.90	23.90	66.00	63.00	33.00	19.20	245.00	245.00	2.00	-1,633.00	15-Mar-2013	-233.29
41	2.10	2.10	24.90	23.70	68.00	67.00	20.00	56.00	#NULL!	1,492.00	3.00	-1,492.00	15-Mar-2013	-213.14

	HX	HY	HZ	IA	IB	IC	ID	IE	IF	IG	IH	II
1	duradiseaeinmonths	wtincreas	wtdecreas	wtdecreasonly	cd4noincrease	lastcd4less200	catchangeinARTtime	TNSsensory	TNSmotor	TNSautonomuic	TNSpinsen	TNSvibration
2	-49.73	1.00	0.00	0.00	0.00	0.00	2.00	3.00	0.00	0.00	2.00	2.00
3	-51.37	1.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	0.00	1.00	1.00
4	-48.10	1.00	0.00	0.00	0.00	0.00	3.00	1.00	0.00	0.00	1.00	1.00
5	-52.53	1.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
6	-53.73	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
7	-52.07	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
8	-52.53	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
9	-48.57	1.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
10	-52.53	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
11	-46.23	0.00	1.00	1.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
12	-54.43	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
13	-53.73	0.00	1.00	1.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
14	-50.43	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
15	-46.93	1.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
16	-46.93	0.00	1.00	1.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
17	-53.23	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
18	-51.37	1.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
19	-50.20	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
20	-55.60	1.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
21	-47.40	1.00	0.00	0.00	0.00	1.00	2.00	0.00	0.00	0.00	0.00	0.00
22	-49.73	1.00	0.00	0.00	1.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
23	-52.73	1.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
24	-49.97	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
25	-48.80	1.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
26	-50.20	1.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
27	-45.77	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
28	-59.33	0.00	1.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
29	-51.37	1.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
30	-39.70	1.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
31	-50.93	1.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
32	-50.80	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
33	-49.97	1.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
34	-49.73	0.00	1.00	1.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
35	-52.53	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
36	-54.20	1.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00
37	-48.33	1.00	0.00	0.00	0.00	1.00	2.00	0.00	0.00	0.00	0.00	0.00
38	-49.73	0.00	1.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
39	-54.20	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
40	-54.43	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
41	-49.73	1.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00

	IJ	IK	IL	IM	IN	IO
1	TNSstrength	TNSreflexes	TNSQST	TNSsural	TNSperoneal	TNS
2	0.00	2.00	#NULL!	4.00	4.00	17.00
3	0.00	1.00	#NULL!	5.00	4.00	13.00
4	0.00	1.00	#NULL!	5.00	5.00	14.00
5	0.00	1.00	#NULL!	2.00	3.00	6.00
6	0.00	0.00	#NULL!	3.00	3.00	6.00
7	0.00	1.00	#NULL!	2.00	3.00	6.00
8	0.00	0.00	#NULL!	2.00	2.00	4.00
9	0.00	1.00	#NULL!	2.00	3.00	6.00
10	0.00	0.00	#NULL!	0.00	0.00	0.00
11	0.00	0.00	#NULL!	0.00	0.00	0.00
12	0.00	0.00	#NULL!	0.00	0.00	0.00
13	0.00	0.00	#NULL!	0.00	0.00	0.00
14	0.00	0.00	#NULL!	0.00	0.00	0.00
15	0.00	0.00	#NULL!	0.00	0.00	0.00
16	0.00	0.00	#NULL!	0.00	0.00	0.00
17	0.00	0.00	#NULL!	0.00	0.00	0.00
18	0.00	0.00	#NULL!	0.00	0.00	0.00
19	0.00	0.00	#NULL!	0.00	0.00	0.00
20	0.00	0.00	#NULL!	0.00	0.00	0.00
21	0.00	0.00	#NULL!	0.00	0.00	0.00
22	0.00	0.00	#NULL!	0.00	0.00	0.00
23	0.00	0.00	#NULL!	0.00	0.00	0.00
24	0.00	0.00	#NULL!	0.00	0.00	0.00
25	0.00	0.00	#NULL!	0.00	0.00	0.00
26	0.00	0.00	#NULL!	0.00	0.00	0.00
27	0.00	0.00	#NULL!	0.00	0.00	0.00
28	0.00	0.00	#NULL!	0.00	0.00	0.00
29	0.00	0.00	#NULL!	0.00	0.00	0.00
30	0.00	0.00	#NULL!	0.00	0.00	0.00
31	0.00	0.00	#NULL!	0.00	0.00	0.00
32	0.00	0.00	#NULL!	0.00	0.00	0.00
33	0.00	0.00	#NULL!	0.00	0.00	0.00
34	0.00	0.00	#NULL!	0.00	0.00	0.00
35	0.00	0.00	#NULL!	0.00	0.00	0.00
36	0.00	0.00	#NULL!	0.00	0.00	0.00
37	0.00	0.00	#NULL!	0.00	0.00	0.00
38	0.00	0.00	#NULL!	0.00	0.00	0.00
39	0.00	0.00	#NULL!	0.00	0.00	0.00
40	0.00	0.00	#NULL!	0.00	0.00	0.00
41	0.00	0.00	#NULL!	0.00	0.00	0.00